Tormac
PUMPS

THE HARD WORKING PUMP

The result of superior technology and expertise that has stood the test of time.

VERTICAL TURBINE PUMPS | **TVT** - SERIES

Product from an ISO 9001 COMPANY

CE

C O N T E N T S

VERTICAL TURBINE PUMPS

GENERAL DATA

VERTICAL TURBINE PUMPS › **VTP** - SERIES

Vertical turbine pumps are single or multistage in construction and consist of column unit and drive unit assembly. VT pumps are designed to operate without being affected by large fluctuations of the water level. These pumps are supplied with mixed flow or axial flow impeller for higher flow requirement. The transmission shaft in the column pipes are supported with line shaft bearing with self or external lubrication arrangement. And submerged impellers allow the pump to start without need of priming. Ratchet arrangement provided on coupling to avoid reverse rotation.

Bowl

A diffuser with vanes cast integrally.

Impeller

Impellers are of mixed flow or axial flow.

Suction Bell

Designed for smooth entry of water with minimum losses.

Strainer

Stainless steel basket type strainers are provided in standard installation in the suction bell to prevent large solids from entering the pump.

Shaft

The shaft materials provided are of high tensile strength.

Column Pipe

Column pipes are designed in such a way to transfer the water smoothly from bowl assembly to discharge head and the pipes are made either in casted or fabricated.

Bearings
Line Shaft Bearing

Cutlass bearings are of higher bond strength between rubber and shell material. Also provided in composite material like thordon and ferroform. Lubrication by self/external clear water.
Oil lubrication will be provided with bronze bearing.

Discharge Head

Either casted or fabricated discharge head is provided to direct flow from column pipe to discharge head located above the ground level.

Thrust Bearing

Antifriction type bearings are provided for taking hydraulic axial thrust and weight of rotating unit. Lubrication with oil or grease. Non-reverse ratchet assembly provided to prevent reverse rotation of pump due to back flow of the water in case of its tripping.

Motor Stool

Rigid and rugged construction to ensure vibration-free operation of pumpset.

Coupling

Flexible pin bush type couplings are generally provided to couple pump and motor. For line shaft coupling either threaded barrel type or muff couplings are provided.

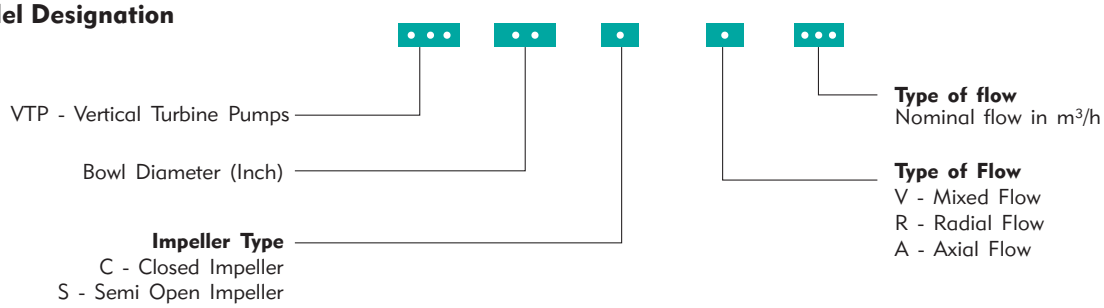
Drive

Electric motor with solid shaft is a standard arrangement on request we can provide vertical hollow shaft drive also. Engine driven pumps are provided with right angle gear drive.

Direction of rotation

Clockwise when viewed from driving end.

Model Designation



Example : VTP 11CV170 – Verticle Turbine Pumps

11 - 11" Bowl
C - Enclosed impeller
V - Mixed flow
170 - 170m³/h

Operating Data

Maximum Flow	Upto 16000 m³/h
Speed	1450/2900 RPM
Impeller Type	Enclosed Impeller
Outlet Size	upto 900mm
Power	upto 2400kW
Liquid Temperature	upto 90°C
Shaft Seal	Gland Packing, Mechanical Seal
Material of Construction (MOC)	Cast Iron, Bronze, Stainless steel, duplex and super duplex
Line shaft	Self / External clear water or oil
Thrust Bearing Lubrication	Grease, Oil
Maximum working Pressure	upto 25bar

Performance & Specifications

- Wide hydraulic ranges
- Dynamically balanced rotating parts
- Optional surface coating for better efficiency
- Customized material options
- Suction bell bearing provided for better stability

Applications

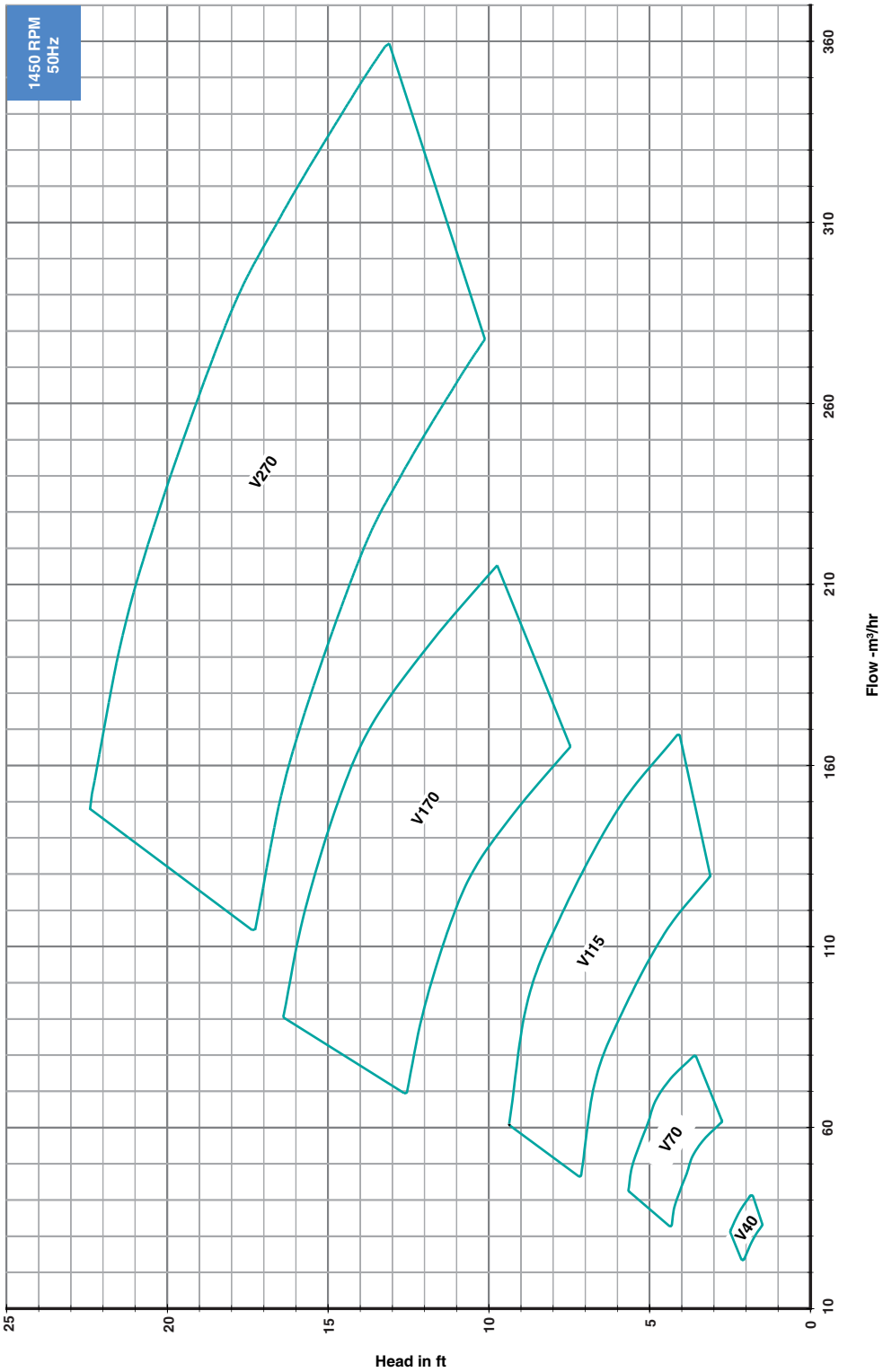
- Raw water intake
- Main cooling water and makeup water supply in power plant
- Various application in steel, cement industry & refineries
- Community water supply
- Dock yard and Off shore platforms
- Flood Control
- Fire fighting
- Irrigation
- Water treatment plants

Note: The company reserves the right to modify the technical specification and the illustrations without notice.

Material of Construction

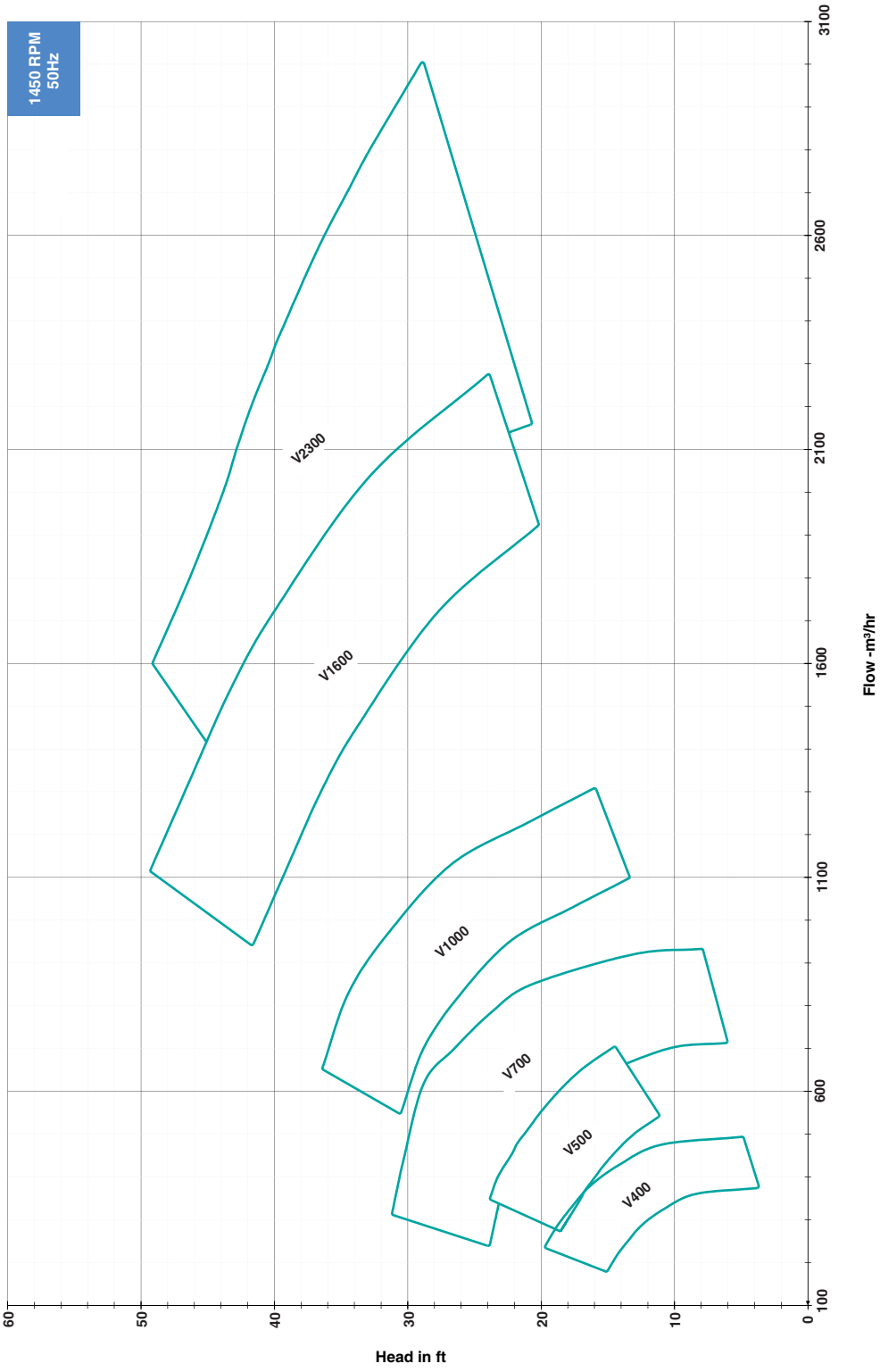
Component	Material	American standard (ASTM)	DIN
Bowl	CI with 2% NI	ASTM A48 Class 40	(0.6025)DIN 1691 GG25
Suction Bell	CI / CI with 2% NI	ASTM A48 Class 40	(0.6025)DIN 1691 GG25
Impeller	Bronze / CF8M / CF8 / CI	ASTMB 584 - C90500	DIN 1705 Rg 5
		ASTMA 351/743 Gr. CF8M	1.4408(GX5CrNiMo19-11-2)
		ASTMA 351 Gr. Cf8	1.4301(X5CrNi18-10)
		ASTM A48 Class 40	(0.6025)DIN 1691 GG25
Wear Ring	Bronze / CF8M / CF8 / CI	ASTMB 584 - C90500	DIN 1705 Rg 5
		ASTMA 351/743 Gr. CF8M	1.4408(GX5CrNiMo19-11-2)
		ASTMA 351 Gr. Cf8	1.4301(X5CrNi18-10)
		ASTM A48 Class 40	(0.6025)DIN 1691 GG25
Shaft	SS410 / SS316 / SS304	ASTMA 276 type 410	1.4006(X10Cr13)
		ASTMA 276 type 316	1.4401(X5CrNiMo17122)
		ASTMA 276 type 304	1.4301(X5CrNi18-10)
Sleeve	SS410 / SS316 / SS304	ASTMA 276 type 410	1.4006(X10Cr13)
		ASTMA 276 type 316	1.4401(X5CrNiMo17122)
		ASTMA 276 type 304	1.4301(X5CrNi18-10)
Pipe Column	Mild Steel	ASTM-A283 GR.D	DIN 1700 GR ST4-2 Fabricated Steel 44
Enclosing Pipe	Mild Steel	ASTM-A283 GR.D	DIN 1700 GR ST4-2 Fabricated Steel 44
Cone Pipe	CI / Mild Steel	ASTM A48 Class 40	(0.6025)DIN 1691 Gg25
		ASTM-A283 GR.D	DIN 1700 GR ST4-2 Fabricated Steel 44
Discharge Head	CI / Mild Steel	ASTM A48 Class 40	(0.6025)DIN 1691 Gg25
		ASTM-A283 GR.D	DIN 1700 GR ST4-2 Fabricated Steel 44
Motor Stool	CI / Mild Steel	ASTM A48 Class 40	(0.6025)DIN 1691 Gg25
		ASTM-A283 GR.D	DIN 1700 GR ST4-2 Fabricated Steel 44
Sole Plate	Mild Steel	ASTM-A283 GR.D	DIN 1700 GR ST4-2 Fabricated Steel 44
Strainer	SS304	ASTMA 276 type 304	1.4301(X5CrNi18-10)
Bearing Holder	CI	ASTM A48 Class 40	(0.6025)DIN 1691 GG25
Bowl and Line Shaft Bearing	Bronze / Ferroform	Bronze (LTB 4) / Ferroform	Bronze (LTB 4) / Ferroform
	/ Thordon / Rubber	Thordon / Rubber	Thordon / Rubber
Bearing Housing	CI	ASTM A48 Class 40	(0.6025)DIN 1691 GG25
Bearing Housing Cover	CI	ASTM A48 Class 40	(0.6025)DIN 1691 GG25
Key	SS410 / SS316 / SS304	ASTMA 276 type 410	1.4006(X10Cr13)
		ASTMA 276 type 316	1.4401(X5CrNiMo17122)
		ASTMA 276 type 304	1.4301(X5CrNi18-10)
Pump & Motor Coupling	CI	ASTM A48 Class 40	(0.6025)DIN 1691 GG25
Gland	CI	ASTM A48 Class 40	(0.6025)DIN 1691 GG25

Family Curve



-Performance to tolerance as per ISO 9906 Grade 2B.
-For safety kindly consider a margin of 0.5m higher of NPSH.

Family Curve



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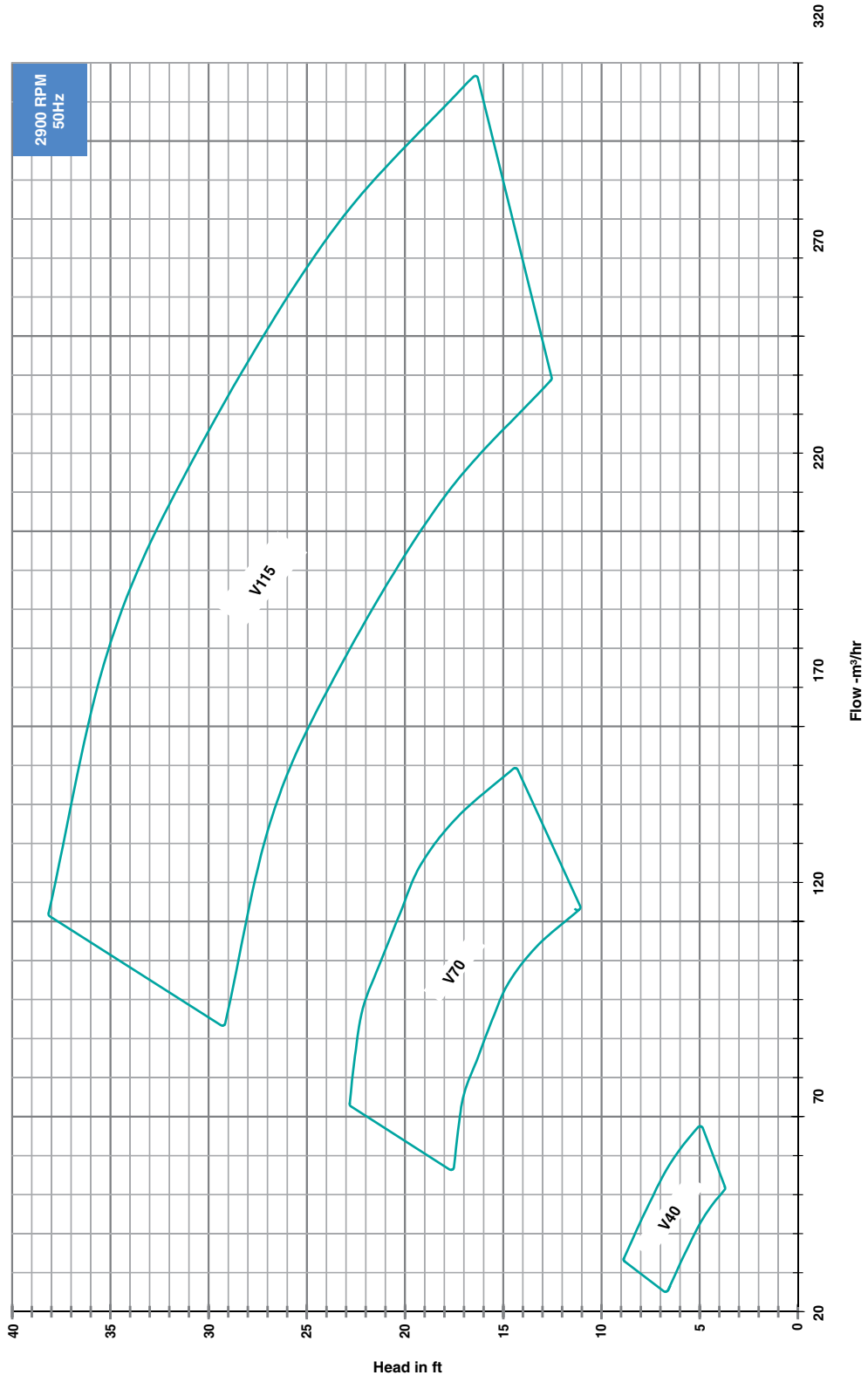
Family Curve

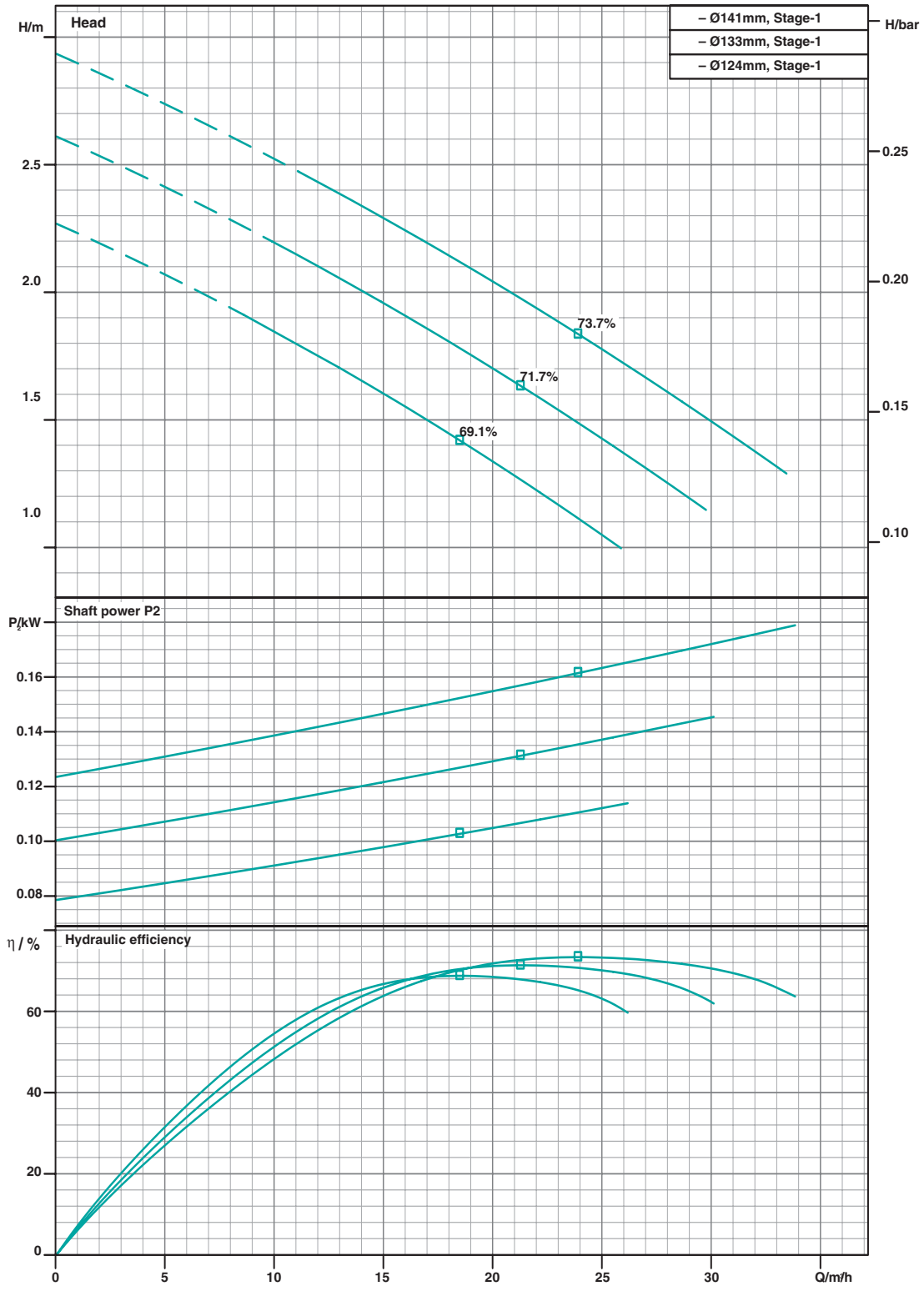


-Performance to tolerance as per ISO 9906 Grade 2B.
-For safety kindly consider a margin of 0.5m higher of NPSH.

Performance Curves

PUMP MODEL | **VT - 7CV40**

Speed 1450 rpm

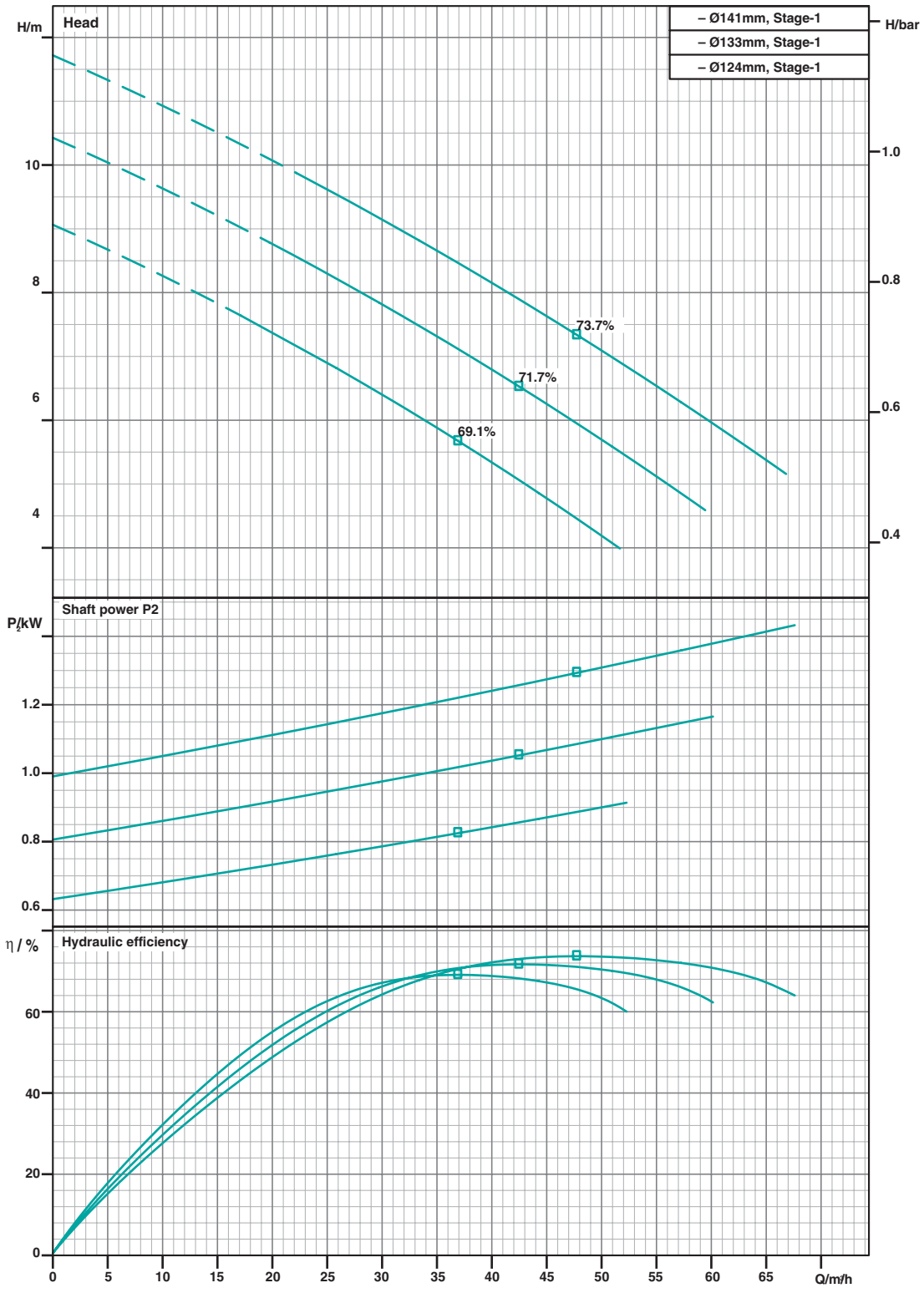


Performance to tolerance as per ISO 9906 Grade 2B.
For safety kindly consider a margin of 0.5m higher of NPSH.

Performance Curves

PUMP MODEL | **VT - 7CV40**

Speed 2900 rpm

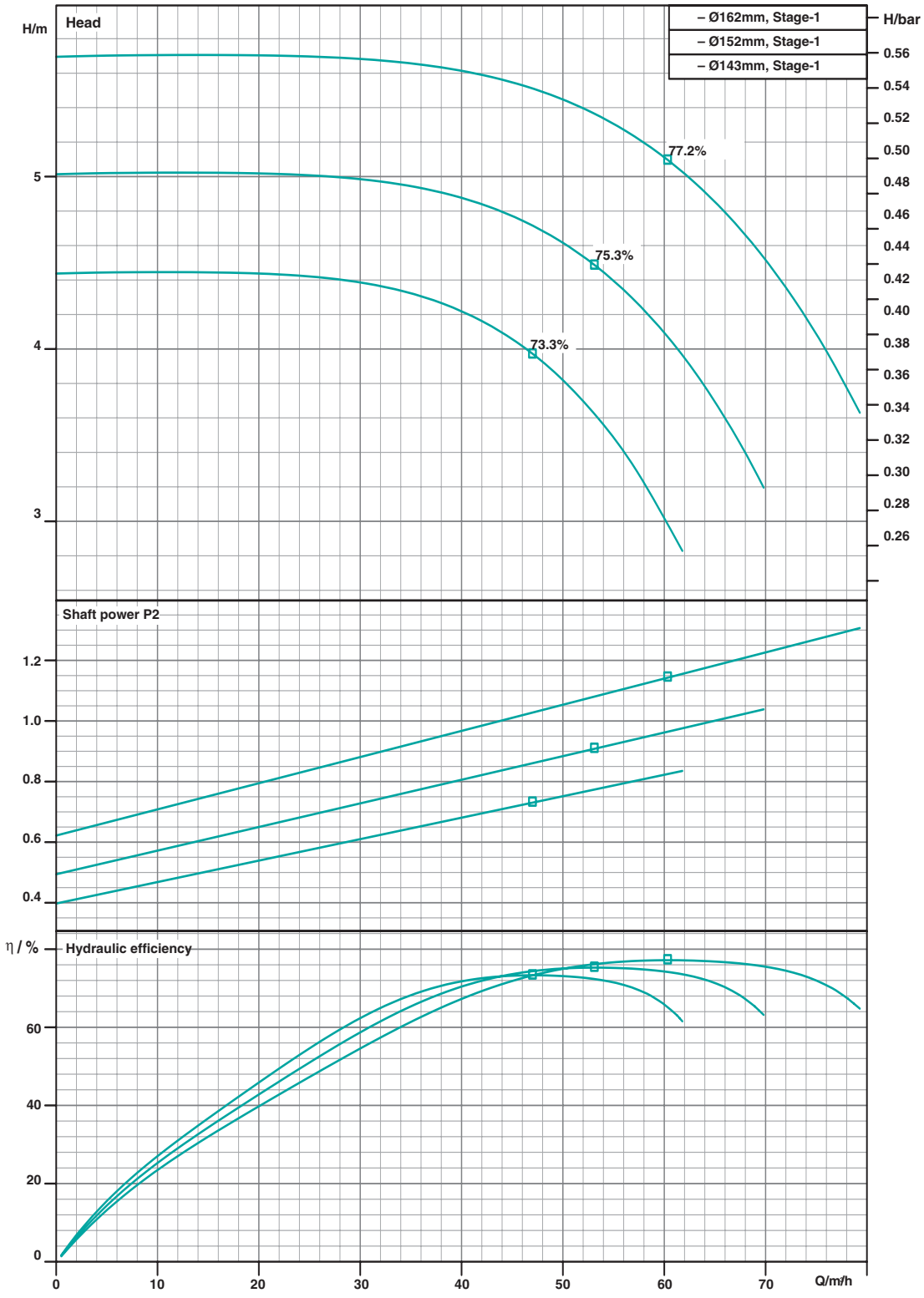


Performance to tolerance as per ISO 9906 Grade 2B.
For safety kindly consider a margin of 0.5m higher of NPSH.

Performance Curves

PUMP MODEL | **VT - 8CV70**

Speed 1450 rpm

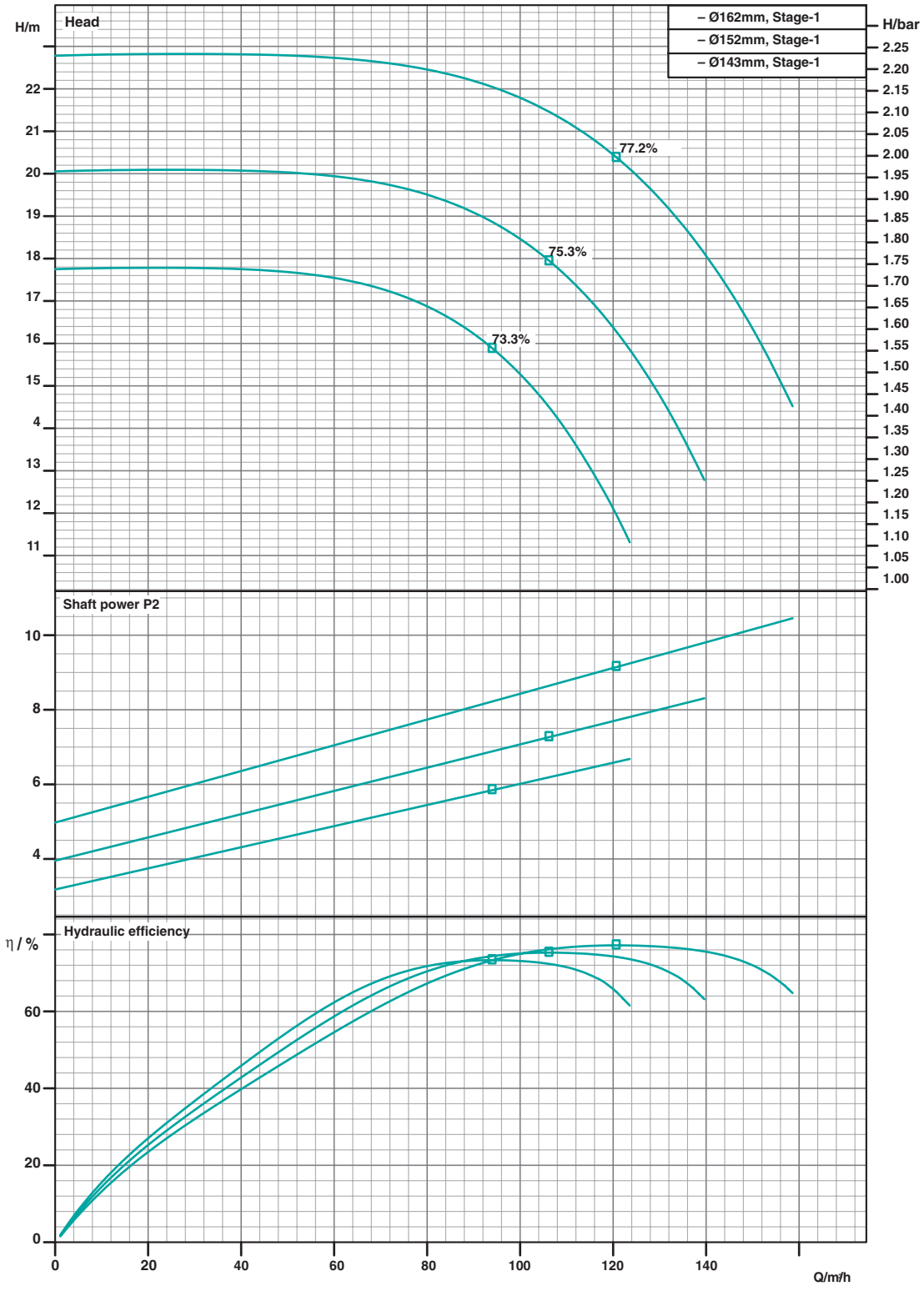


Performance to tolerance as per ISO 9906 Grade 2B.
For safety kindly consider a margin of 0.5m higher of NPSH.

Performance Curves

PUMP MODEL | **VT - 8CV70**

Speed 2900 rpm

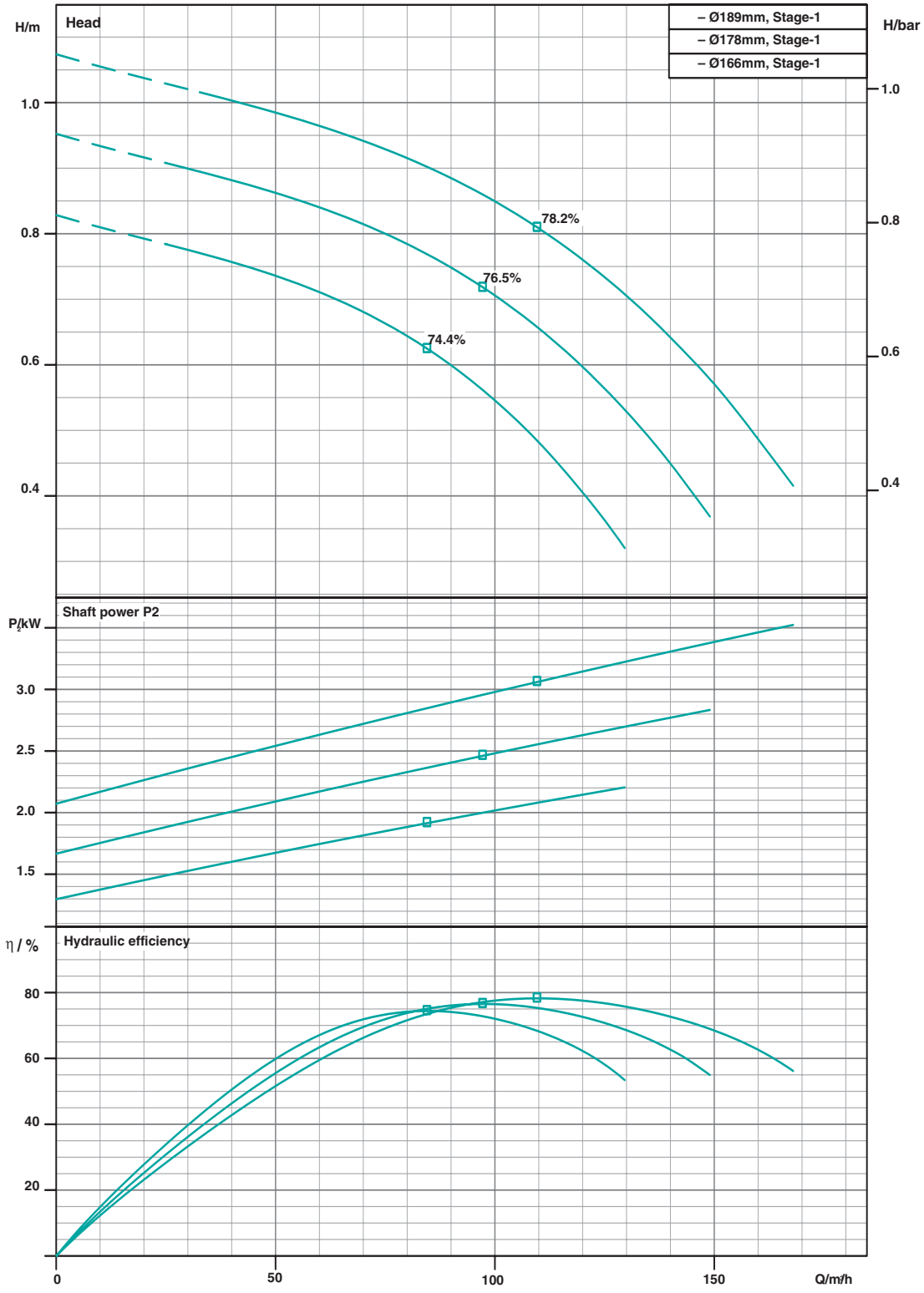


Performance to tolerance as per ISO 9906 Grade 2B.
For safety kindly consider a margin of 0.5m higher of NPSH.

Performance Curves

PUMP MODEL | **VT - 9CV115**

Speed 1450 rpm

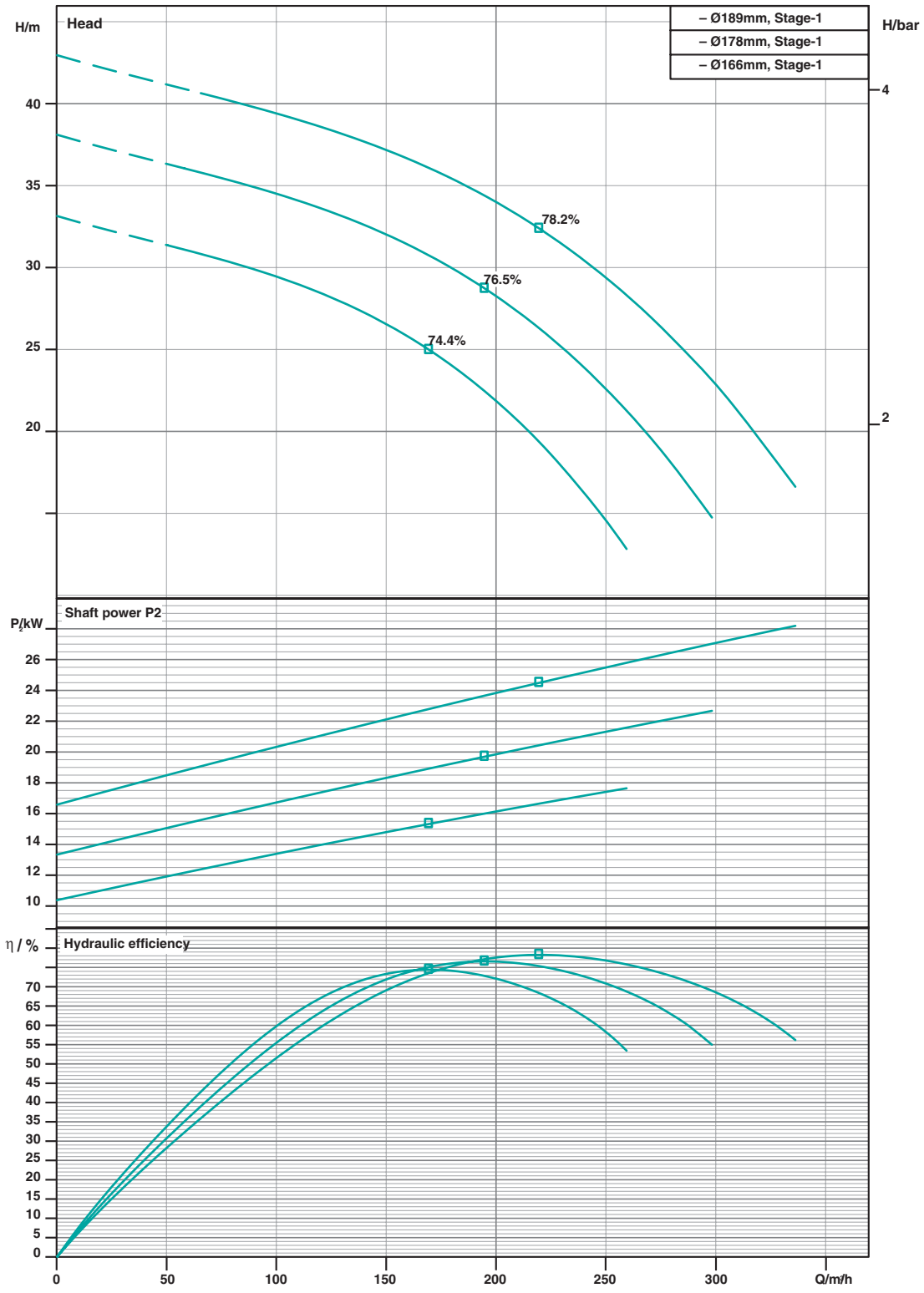


Performance to tolerance as per ISO 9906 Grade 2B.
For safety kindly consider a margin of 0.5m higher of NPSH.

Performance Curves

PUMP MODEL | **VT - 9CV115**

Speed 2900 rpm

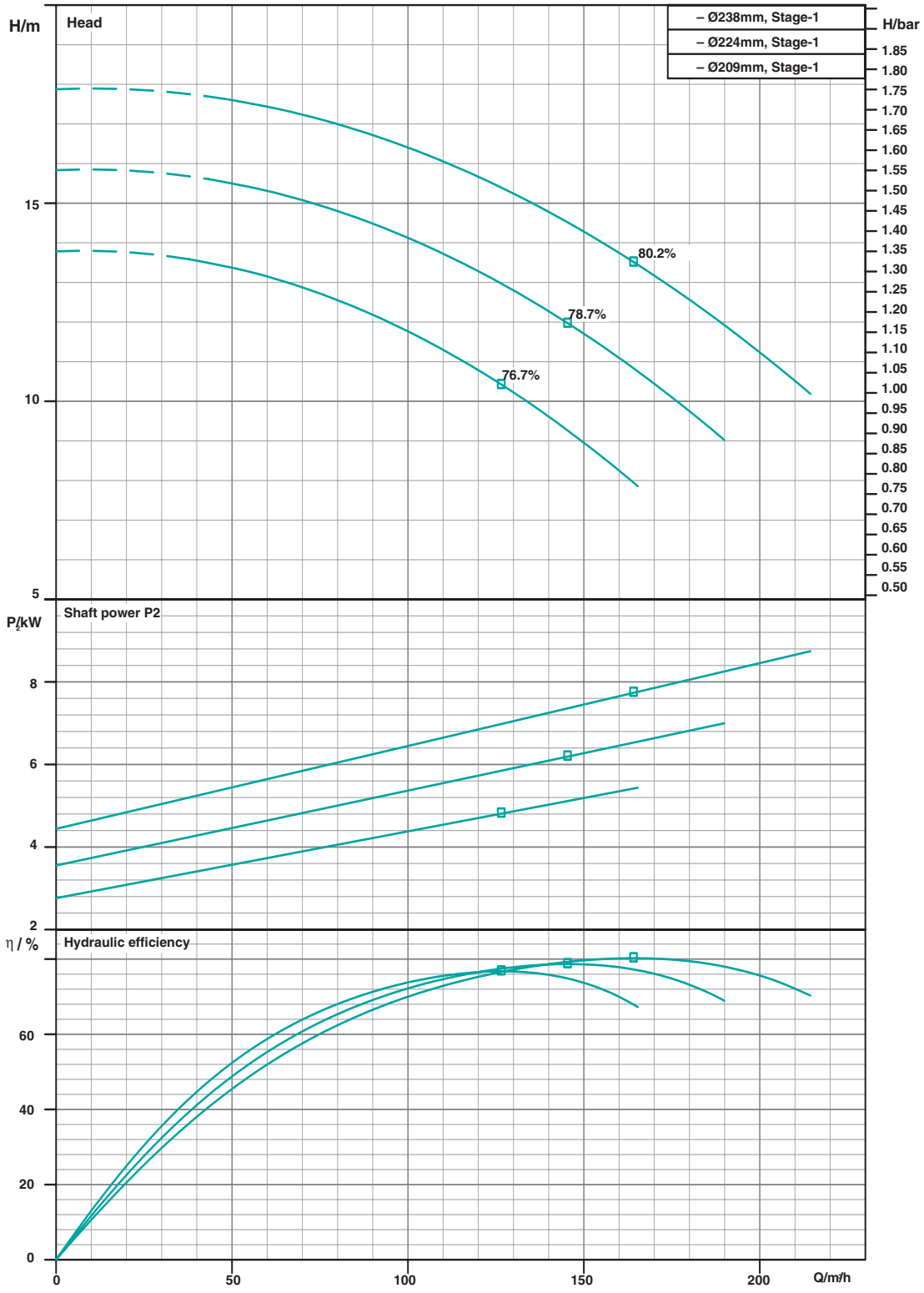


Performance to tolerance as per ISO 9906 Grade 2B.
For safety kindly consider a margin of 0.5m higher of NPSH.

Performance Curves

PUMP MODEL | **VT - 11CV170**

Speed 1450 rpm

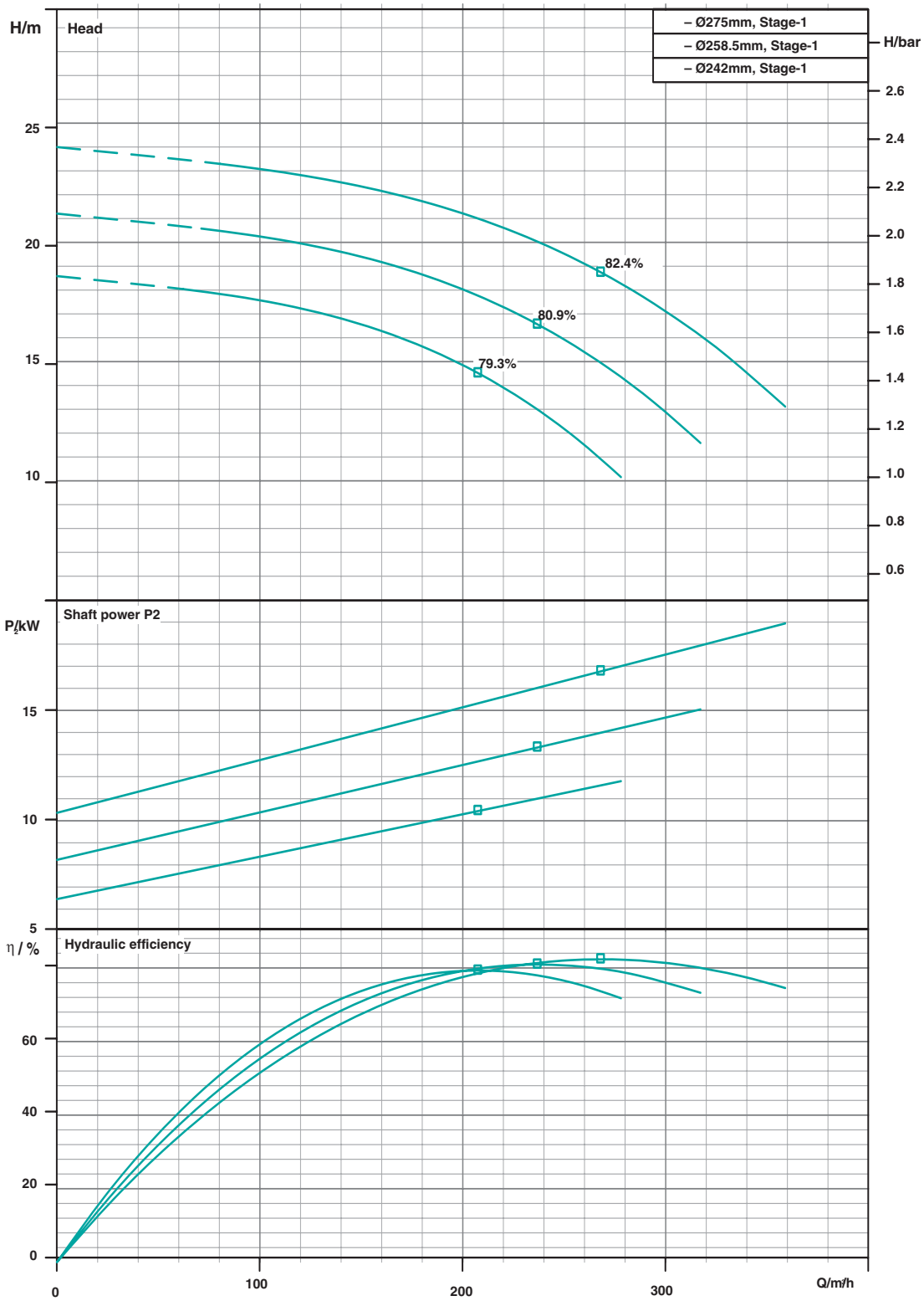


Performance to tolerance as per ISO 9906 Grade 2B.
For safety kindly consider a margin of 0.5m higher of NPSH.

Performance Curves

PUMP MODEL | **VT - 13CV270**

Speed 1450 rpm

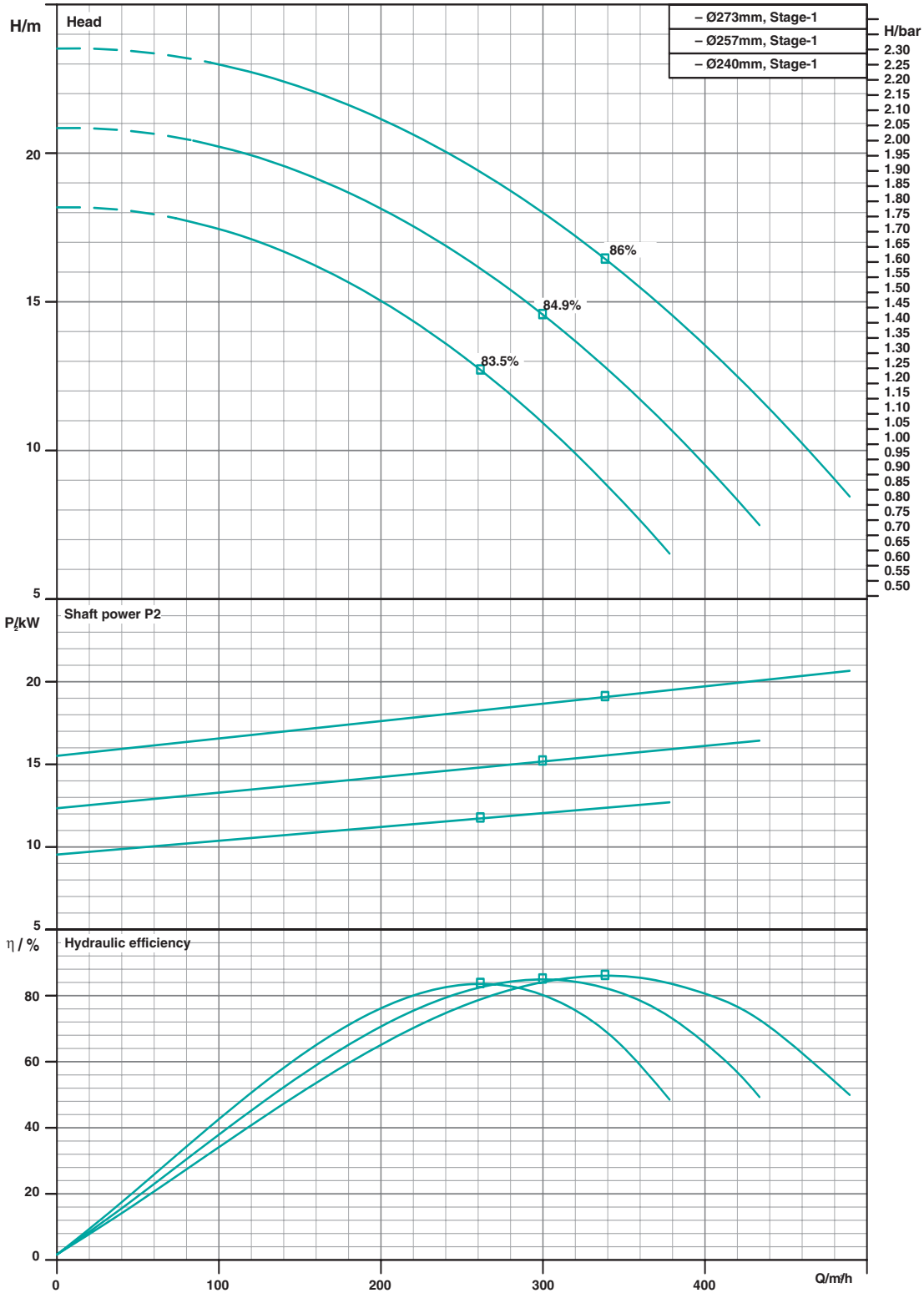


Performance to tolerance as per ISO 9906 Grade 2B.
For safety kindly consider a margin of 0.5m higher of NPSH.

Performance Curves

PUMP MODEL | **VT - 14CV400**

Speed 1450 rpm

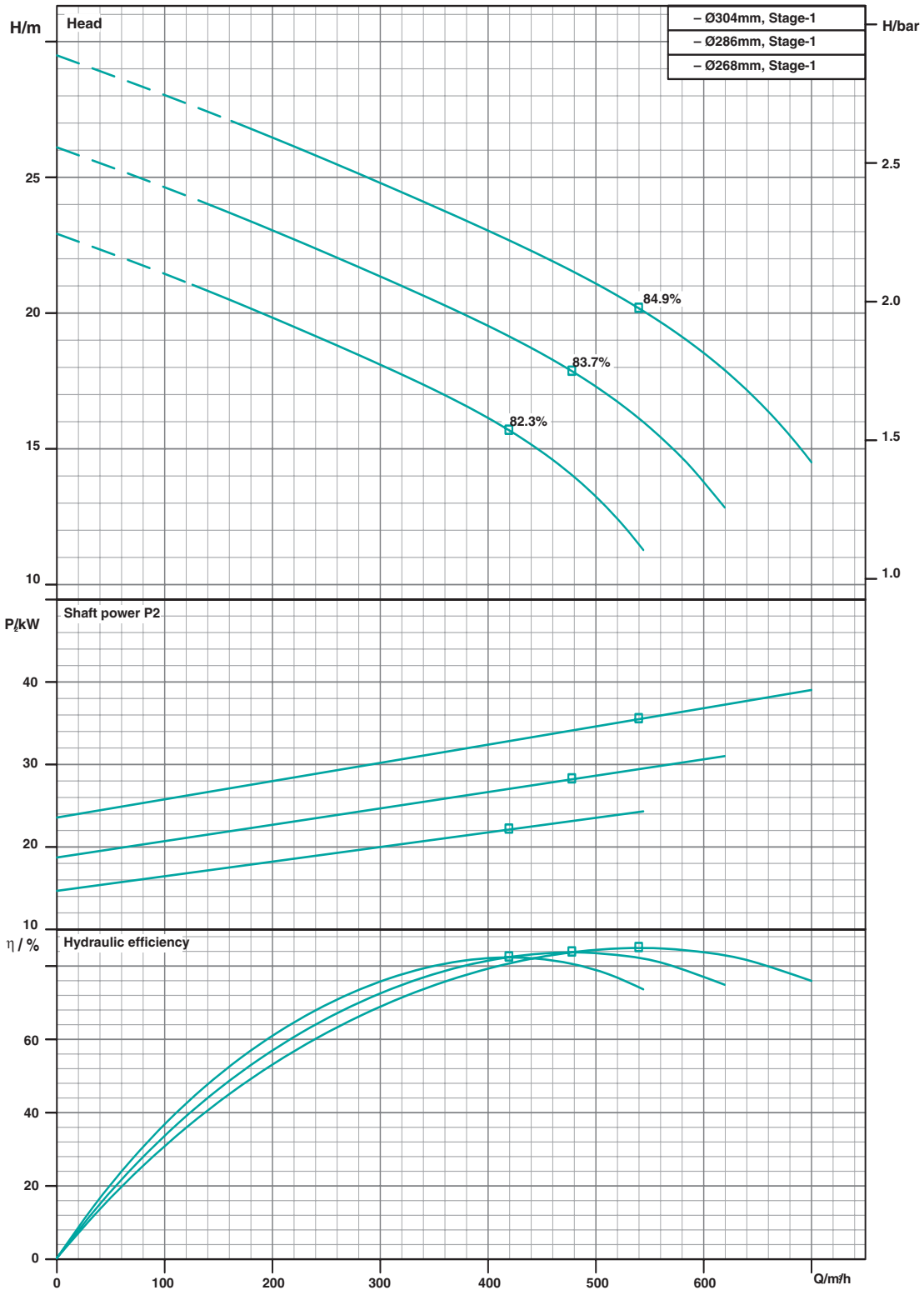


Performance to tolerance as per ISO 9906 Grade 2B.
For safety kindly consider a margin of 0.5m higher of NPSH.

Performance Curves

PUMP MODEL | **VT - 15CV500**

Speed 1450 rpm

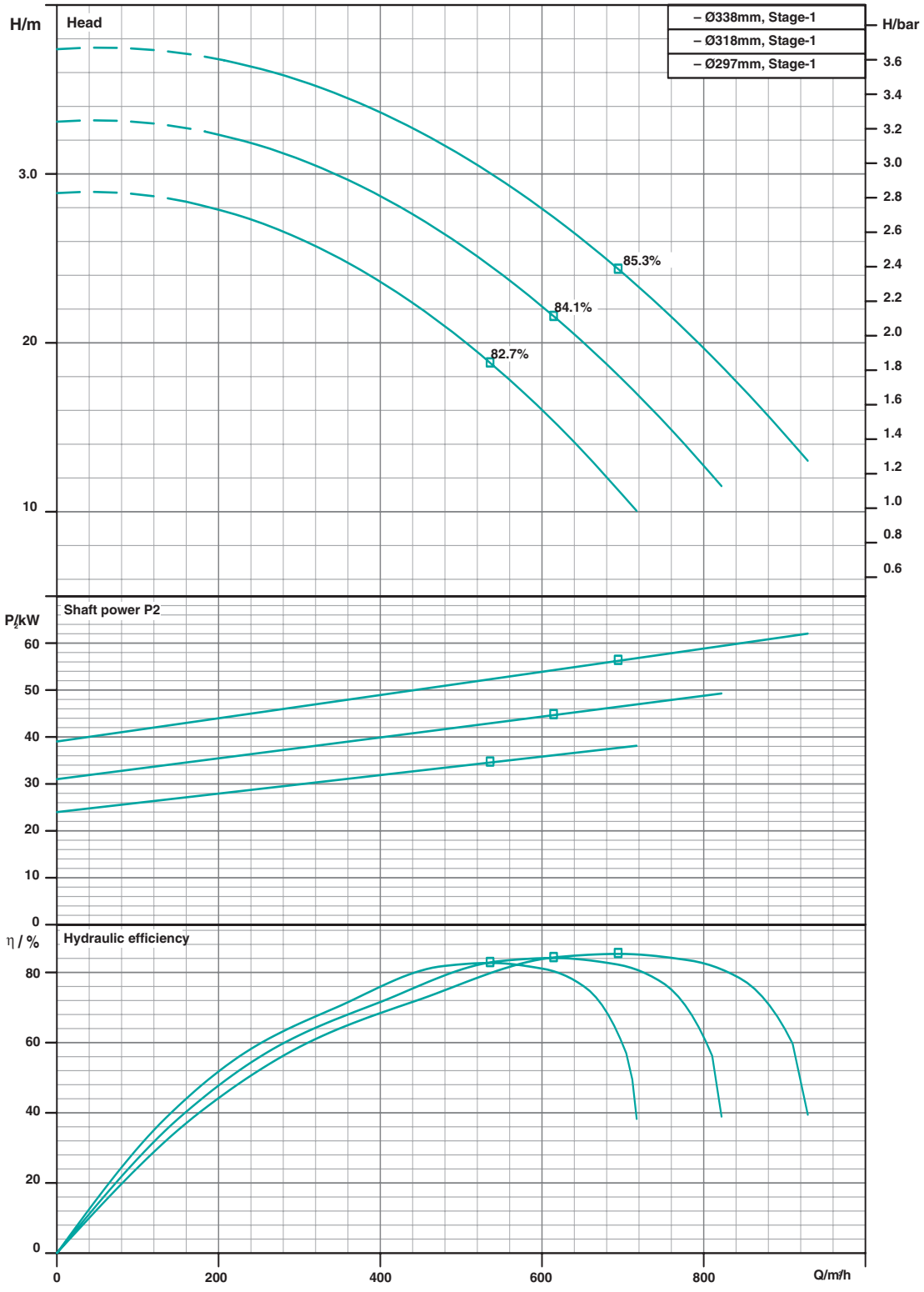


Performance to tolerance as per ISO 9906 Grade 2B.
For safety kindly consider a margin of 0.5m higher of NPSH.

Performance Curves

PUMP MODEL | **VT - 16CV700**

Speed 1450 rpm

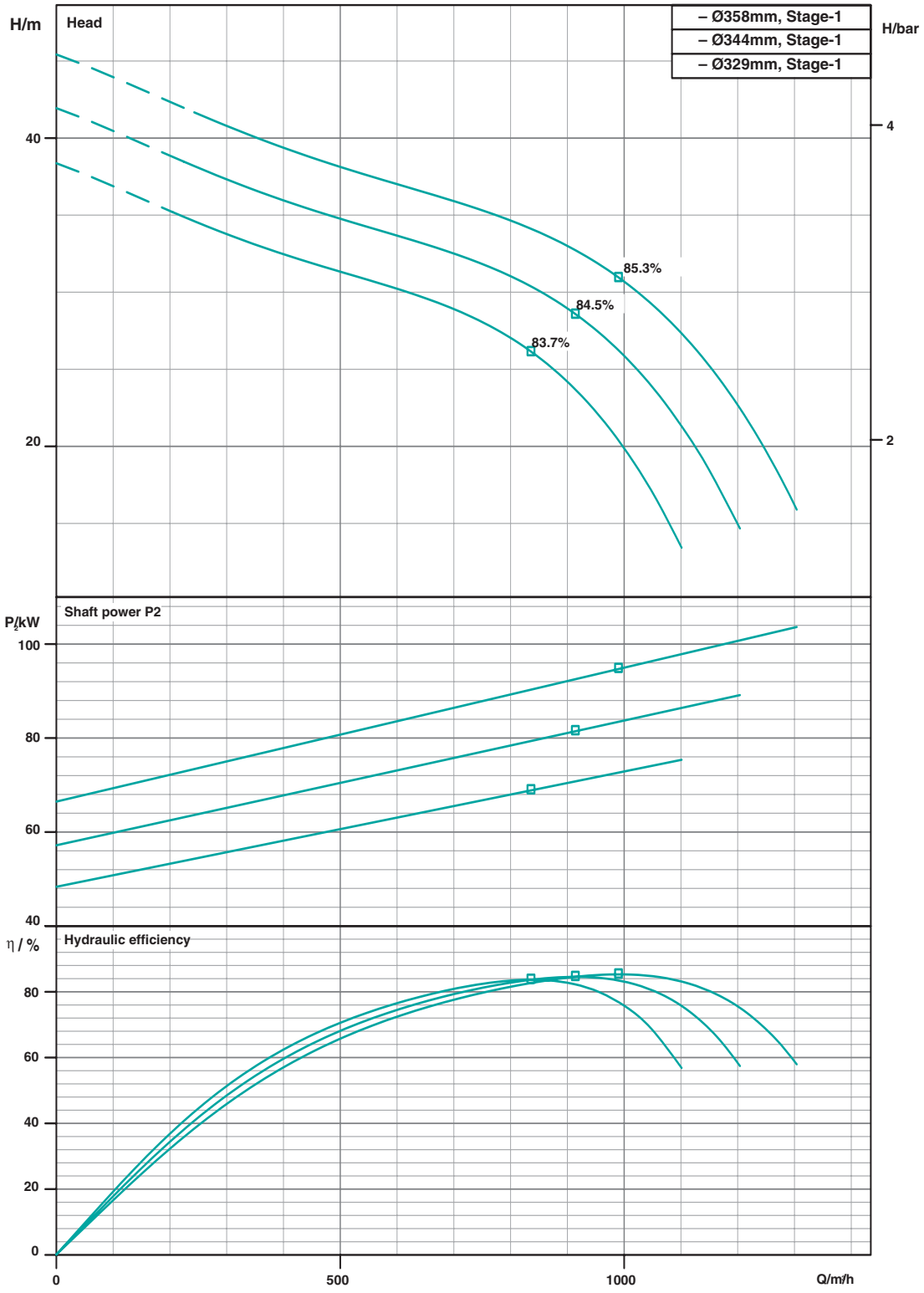


Performance to tolerance as per ISO 9906 Grade 2B.
For safety kindly consider a margin of 0.5m higher of NPSH.

Performance Curves

PUMP MODEL | **VT - 19CV1000**

Speed 1450 rpm

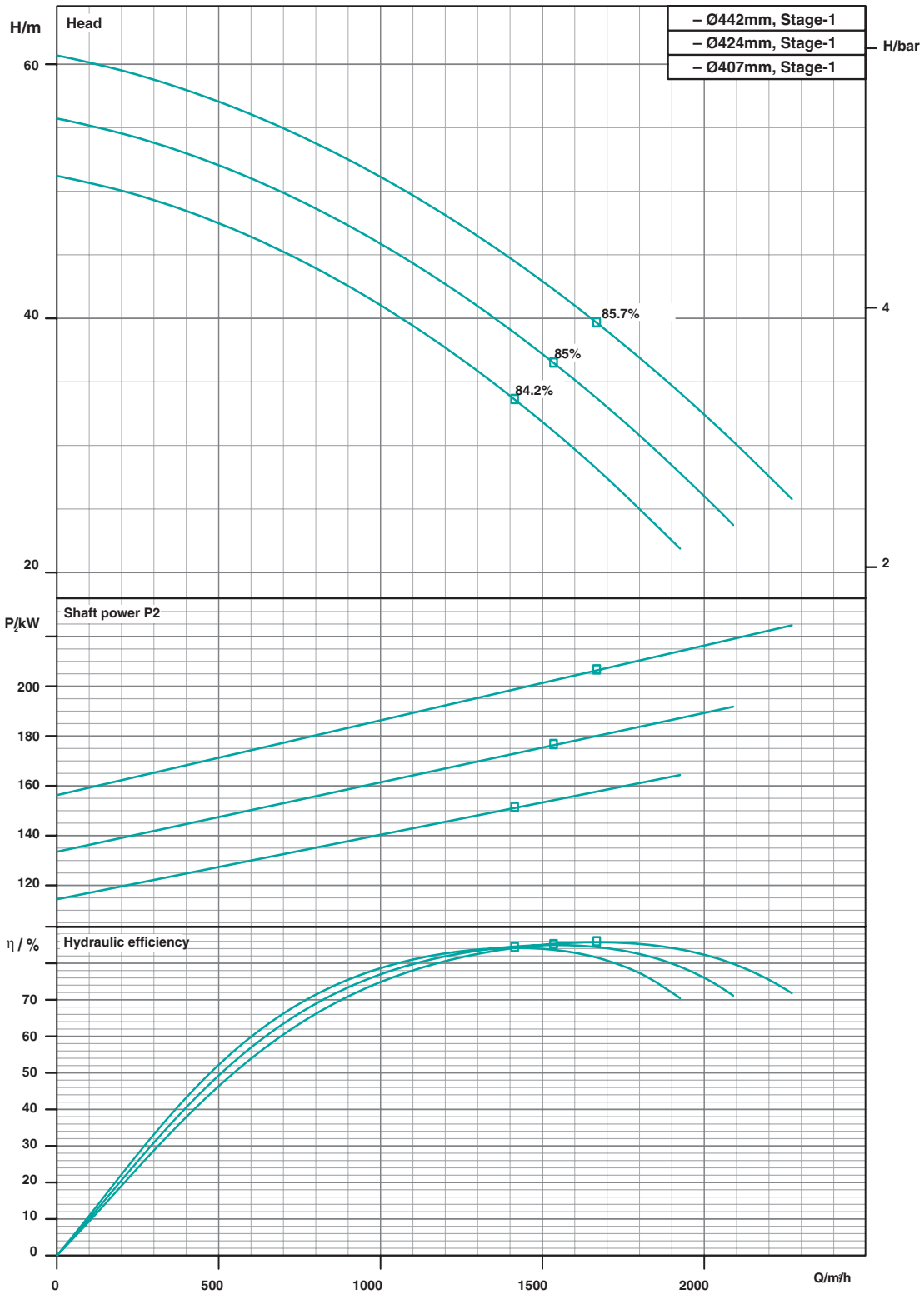


Performance to tolerance as per ISO 9906 Grade 2B.
For safety kindly consider a margin of 0.5m higher of NPSH.

Performance Curves

PUMP MODEL | **VT - 22CV1600**

Speed 1450 rpm

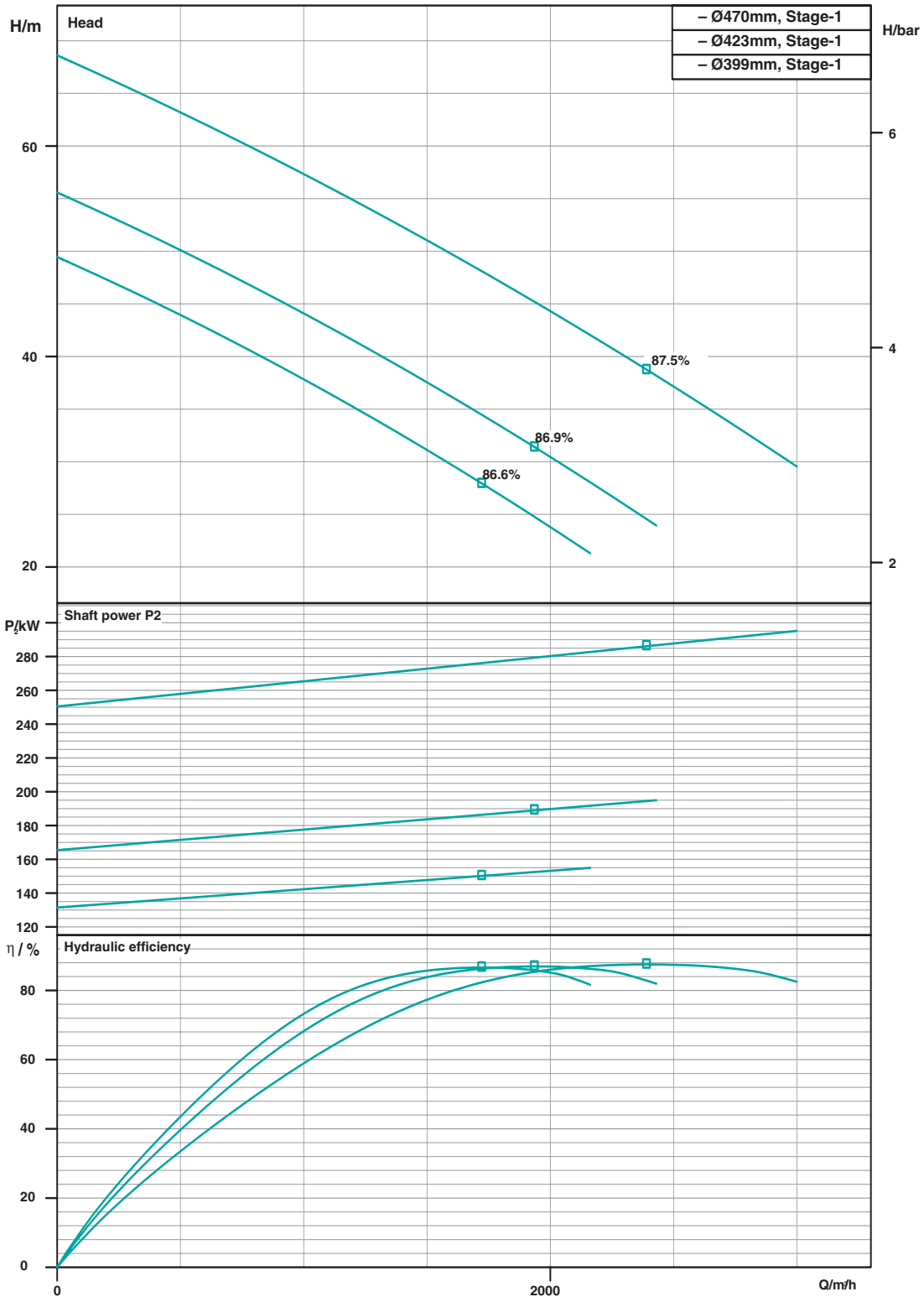


Performance to tolerance as per ISO 9906 Grade 2B.
For safety kindly consider a margin of 0.5m higher of NPSH.

Performance Curves

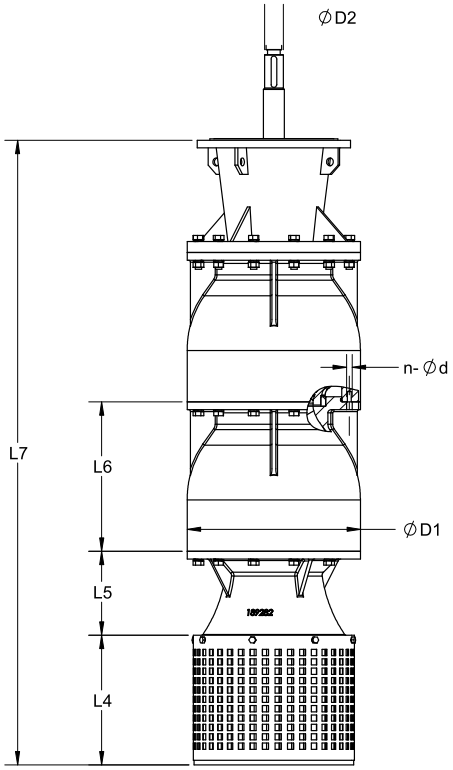
PUMP MODEL | **VT - 23CV2300**

Speed 1450 rpm

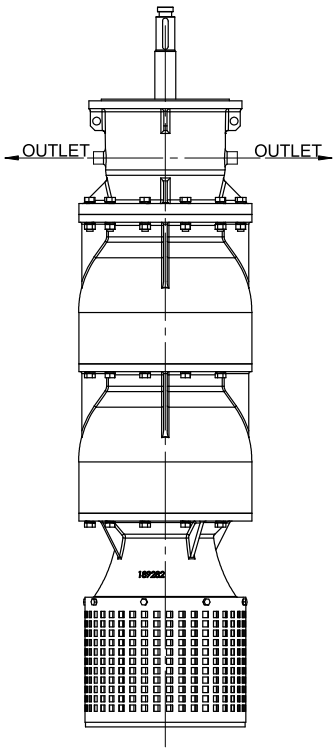


Performance to tolerance as per ISO 9906 Grade 2B.
For safety kindly consider a margin of 0.5m higher of NPSH.

GENERAL DIMENSION AND MOUNTING DETAILS BOWL ASSEMBLY



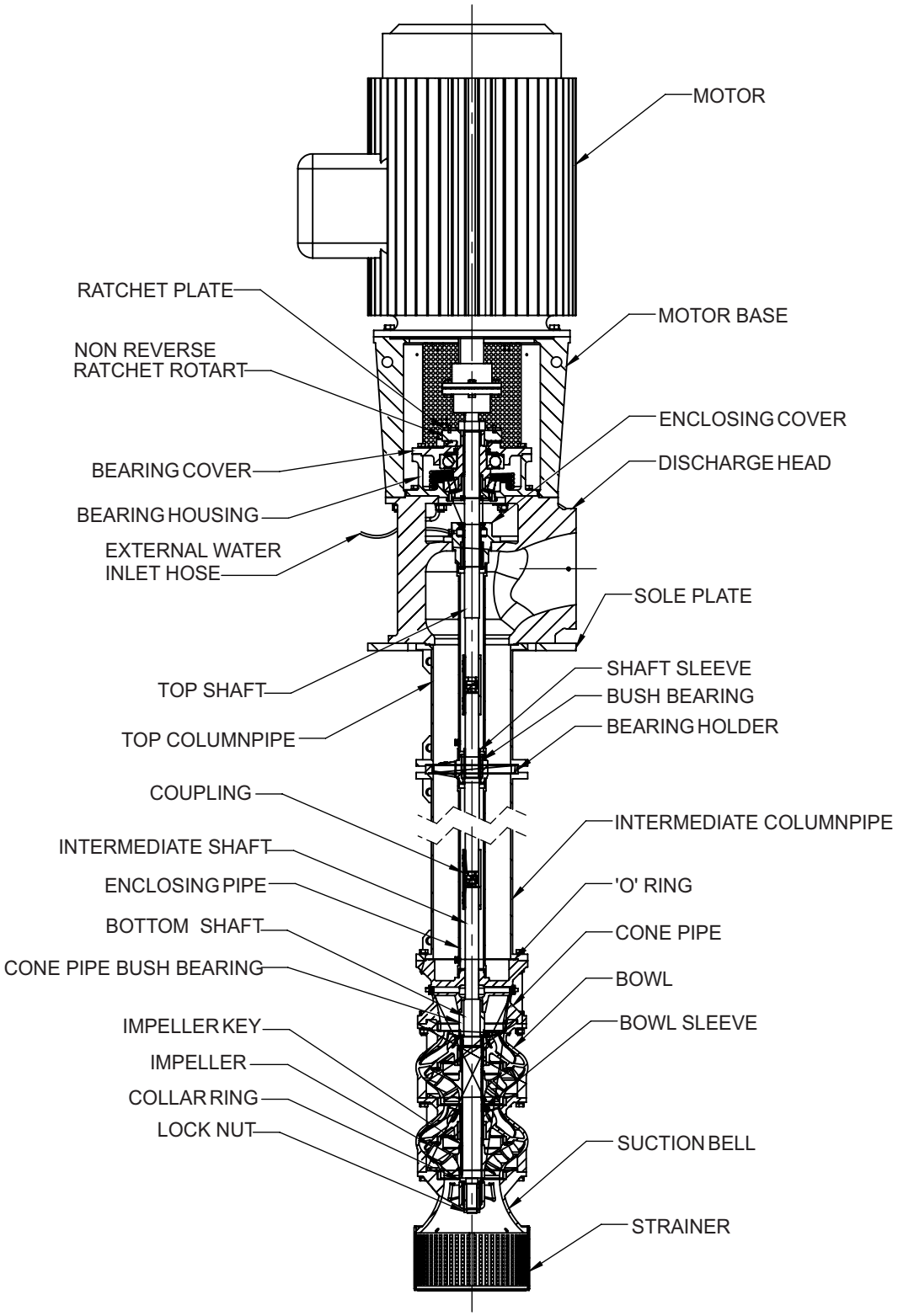
SELF WATER LUBRICATION



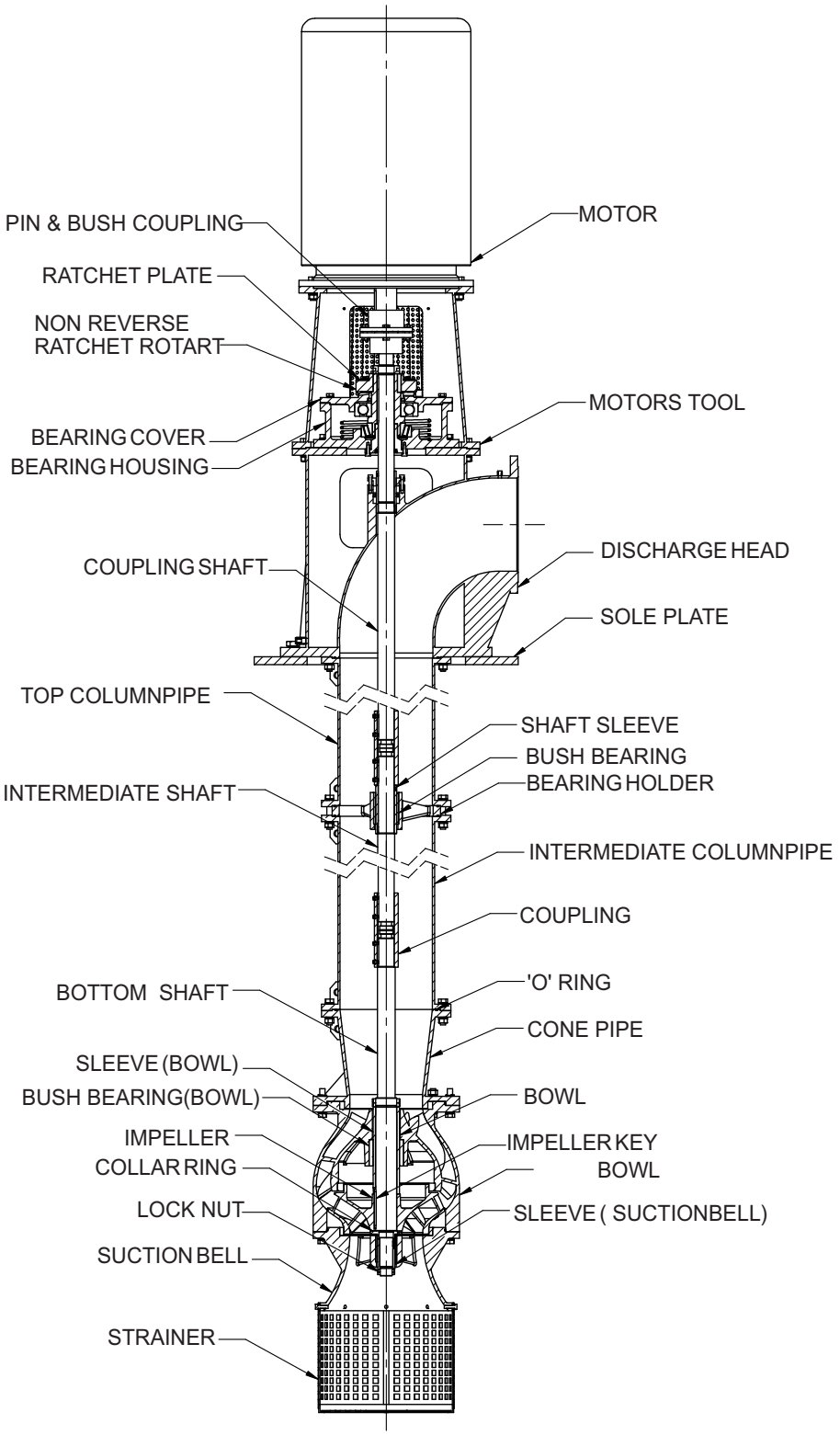
EXTERNAL CLEAR WATER / OIL LUBRICATION

Model	L4	L5	L6	L7	D1	D2	n - Ød
VT - 40	200	90	116	619	175	25	8 - Ø11
VT - 70	200	100	134	646	202	30	8 - Ø11
VT - 115	212	108	155	688	235	35	8 - Ø12
VT - 170	209	170	175	734	282	40	12 - Ø14
VT - 270	212	160	201	782	325	45	12 - Ø14
VT - 400	213	168	230	825	340	50	12 - Ø14
VT - 500	214	185	249	920	365	55	12 - Ø18
VT - 700	320	205	276	1077	408	60	12 - Ø18
VT - 1000	355	235	418	1316	484	65	12 - Ø18
VT - 1600	400	269	478	1506	554	65	12 - Ø22
VT - 2300	431	287	476	1662	574	75	12 - Ø22
VT - 3300	479	320	533	1853	638	75	12 - Ø22
VT - 4500	602	385	672	2379	803	85	16 - Ø22
VT - 5500	638	440	756	2554	850	95	16 - Ø22
VT - 7300	698	485	830	2833	930	95	20 - Ø22
VT - 9500	818	555	970	3263	1090	100	24 - Ø22

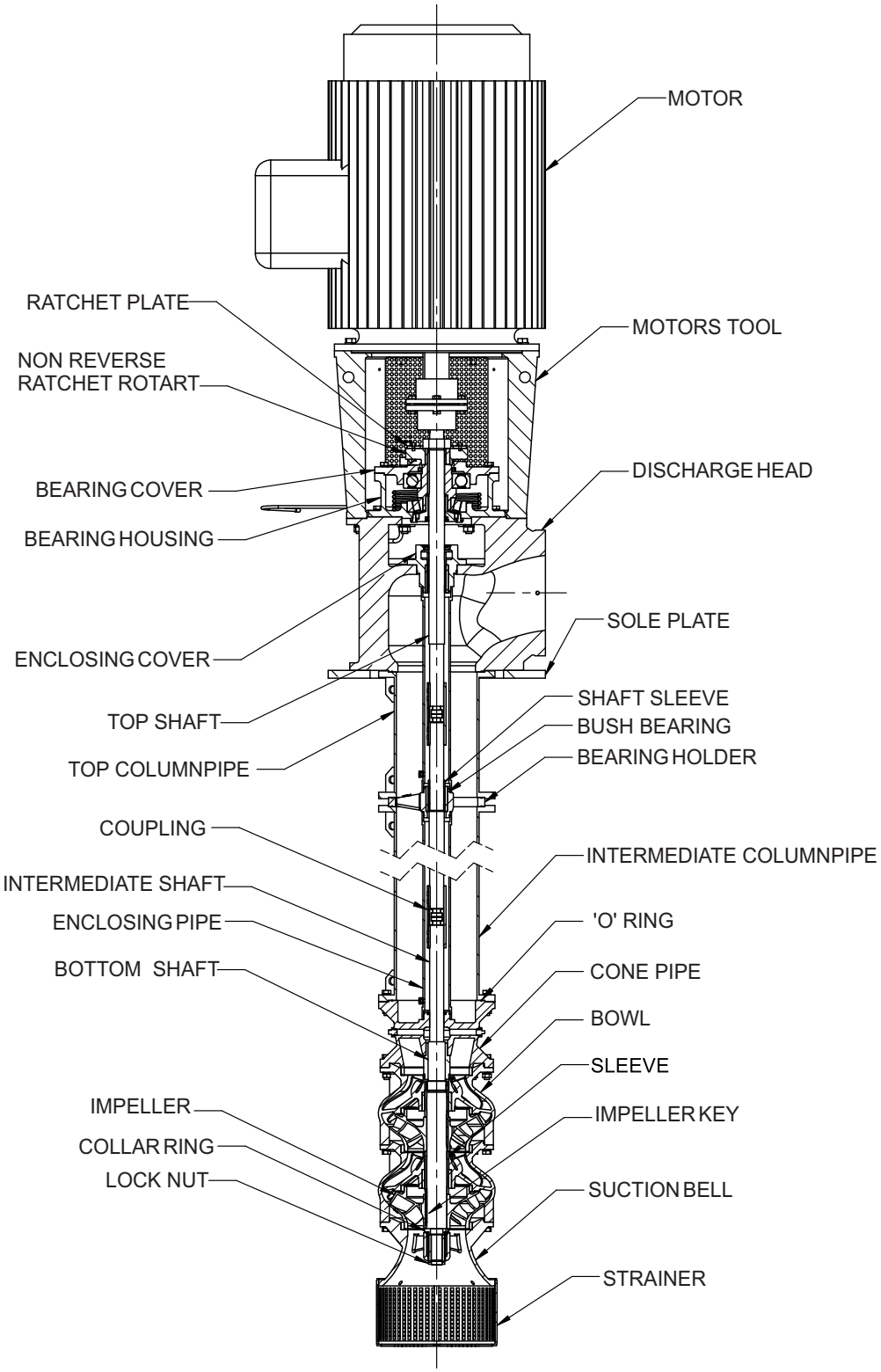
CROSS SECTION VIEW WITH SOLID SHAFT MOTOR FOR EXTERNAL CLEAR WATER LUBRICATION



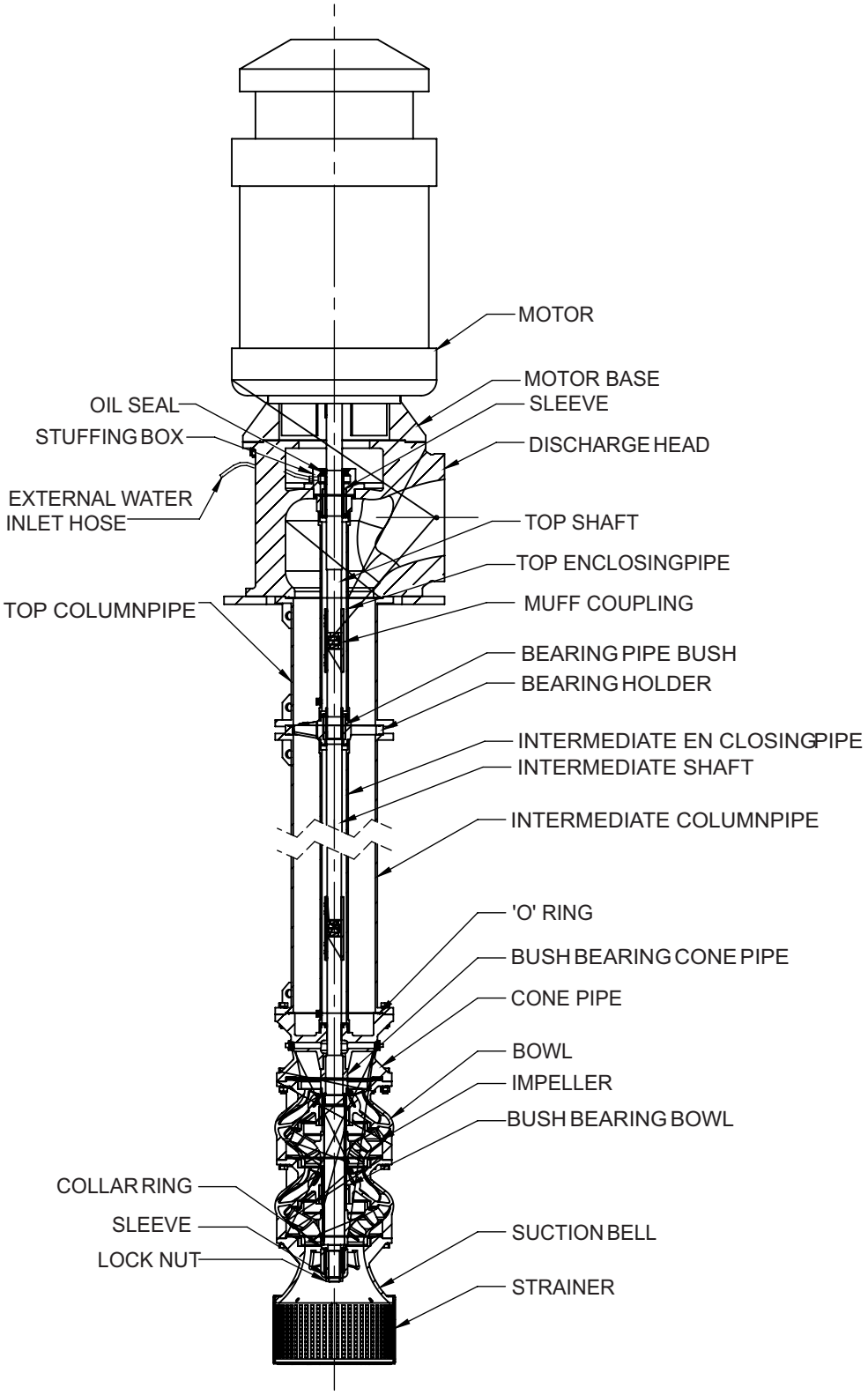
CROSS SECTION VIEW WITH SOLID SHAFT MOTOR FOR SELF WATER LUBRICATION



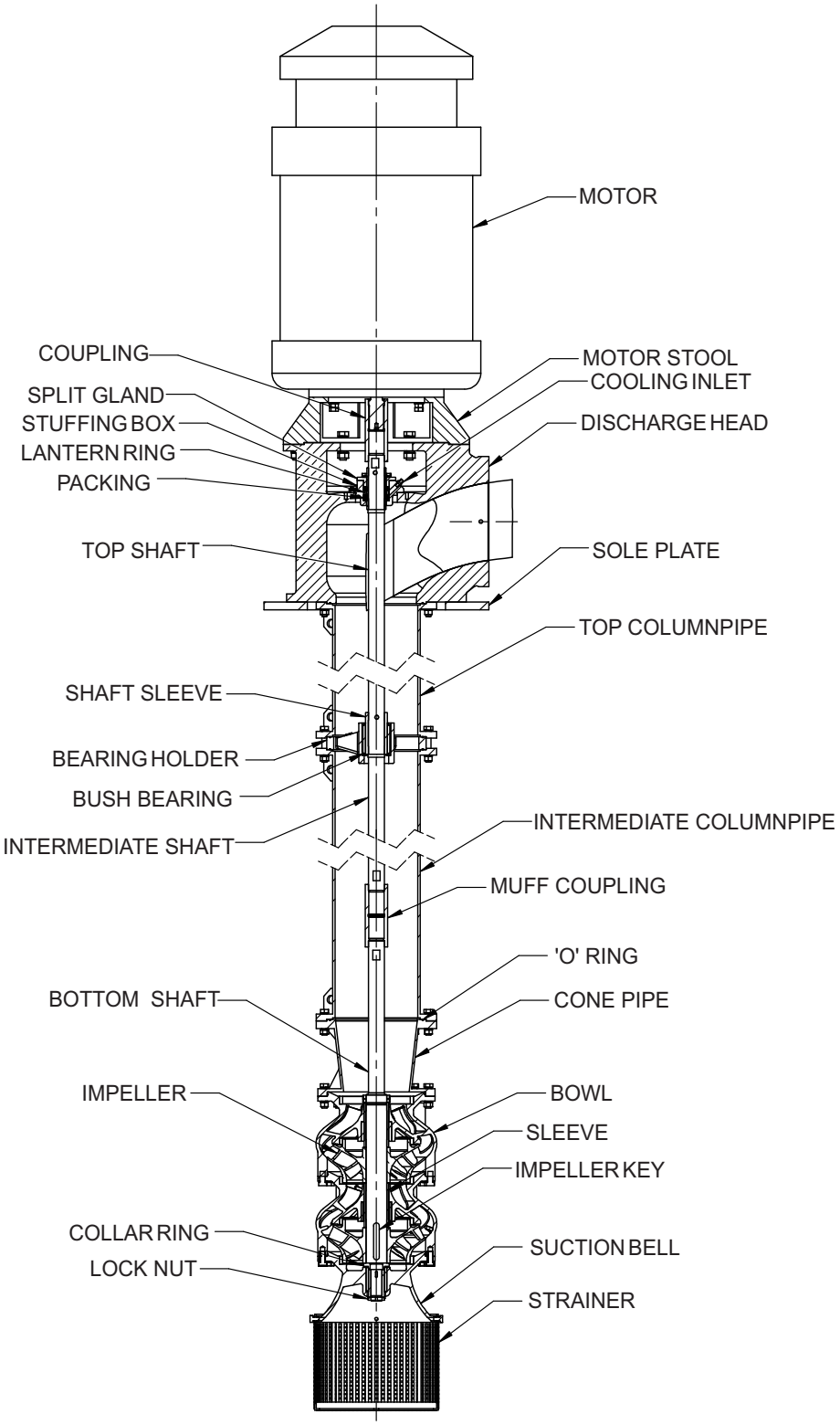
CROSS SECTION VIEW WITH SOLID SHAFT MOTOR FOR OIL LUBRICATION



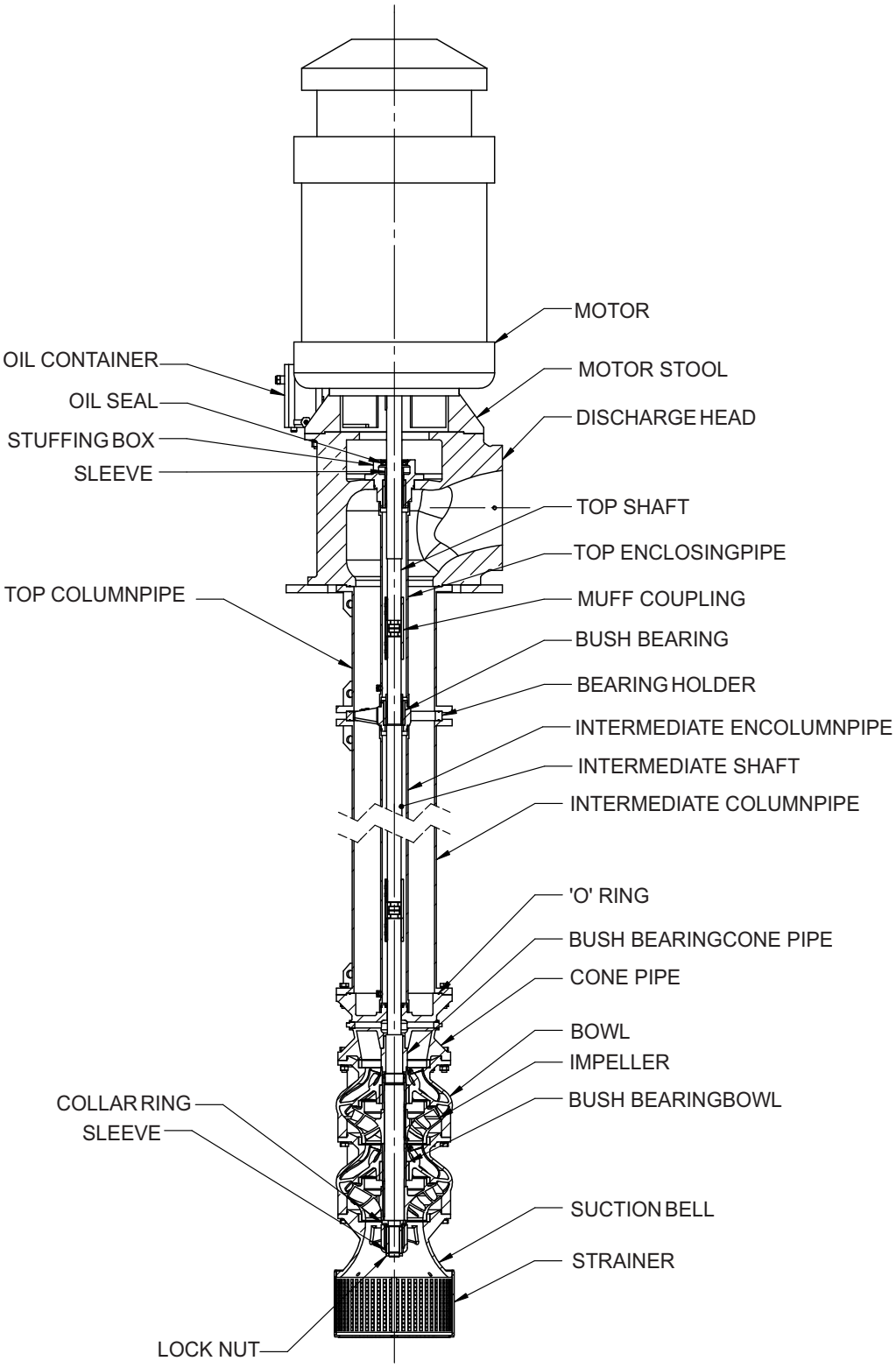
CROSS SECTION VIEW WITH VERTICAL HOLLOW SHAFT MOTOR FOR SELF EXTERNAL CLEAR WATER LUBRICATION



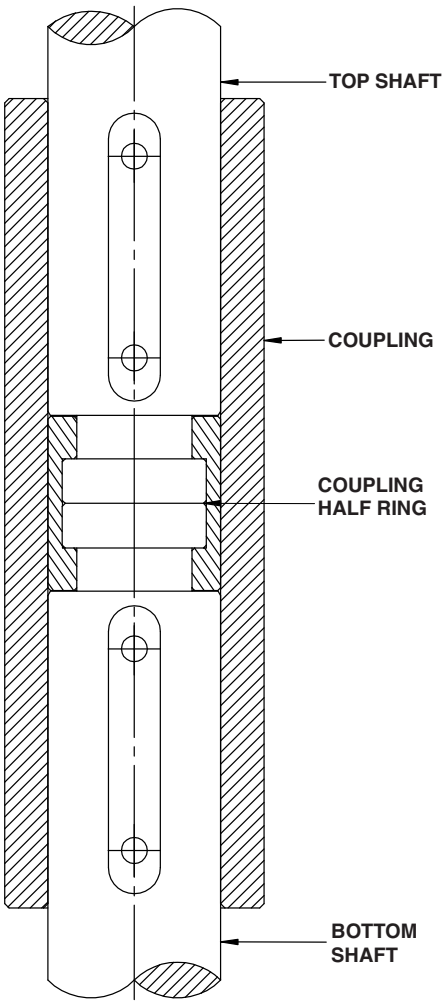
CROSS SECTION VIEW WITH VERTICAL HOLLOW SHAFT MOTOR FOR SELF WATER LUBRICATION



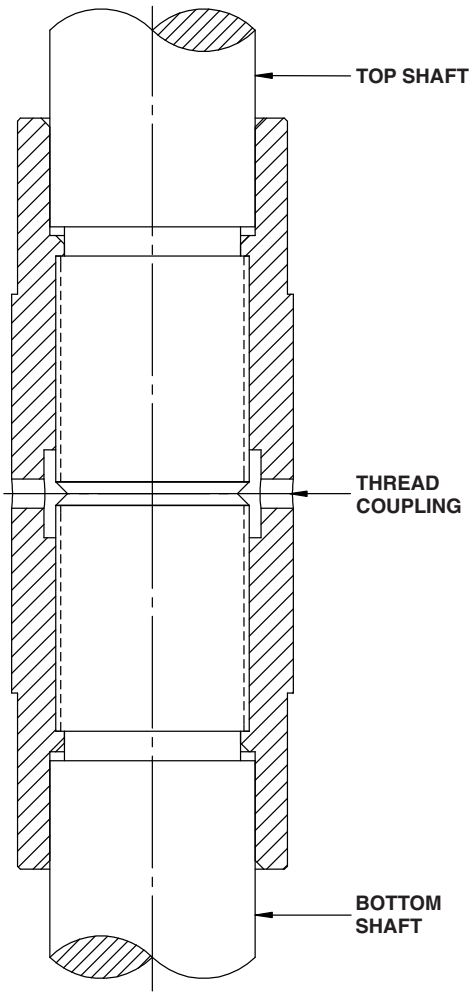
CROSS SECTION VIEW WITH VERTICAL HOLLOW SHAFT MOTOR FOR OIL LUBRICATION



LINE SHAFT COUPLING TYPES

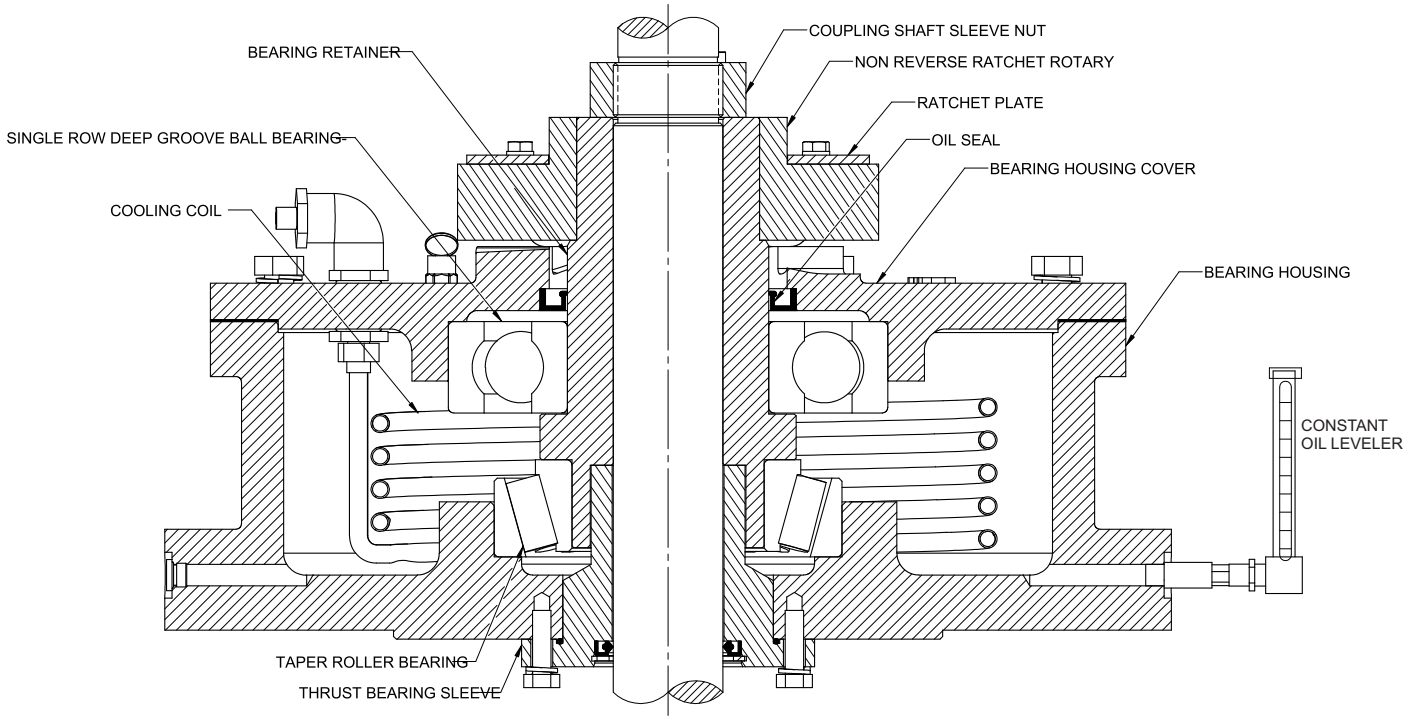


MUFF COUPLING



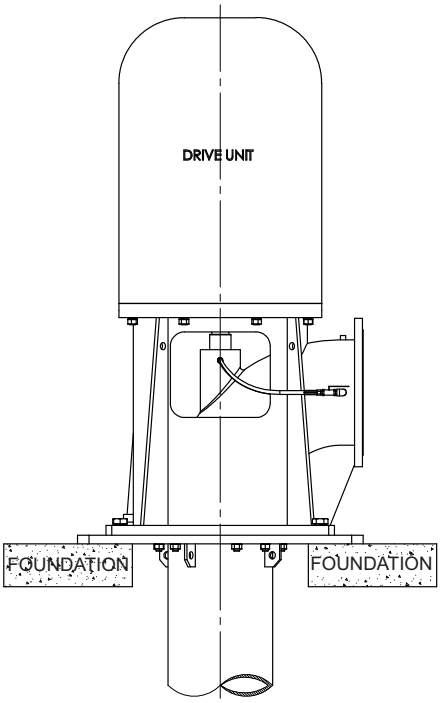
THREAD COUPLING

THRUST BEARING WITH RATCHET ARRANGEMENT

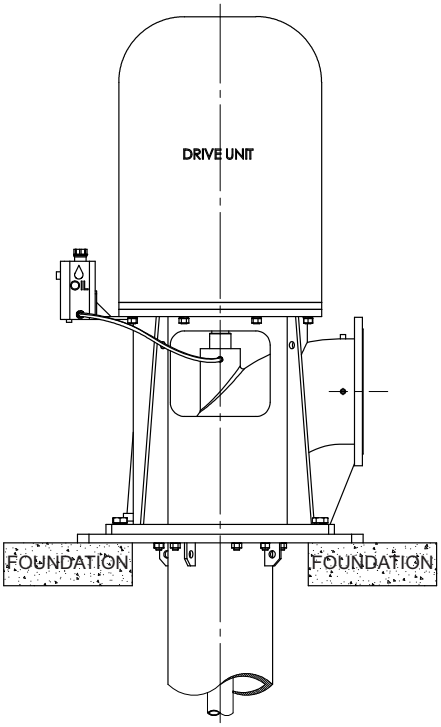


THRUST BEARING ASSEMBLY WITH RATCHET ARRANGEMENT - ANTIFRICTION BEARING

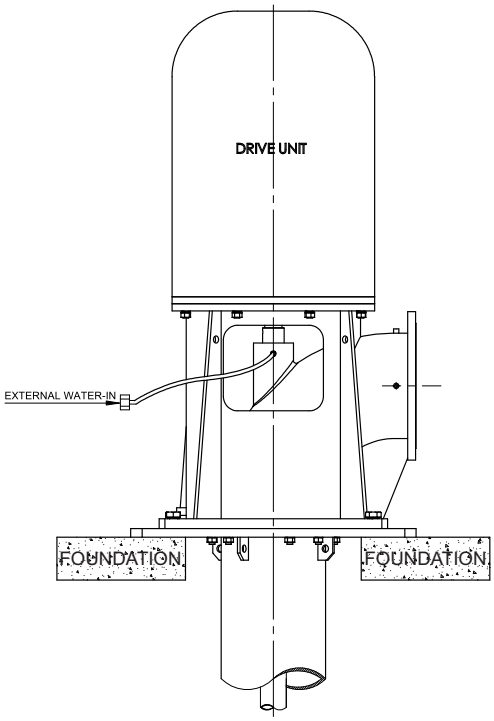
LUBRICATION ARRANGEMENT



SELF WATER LUBRICATION

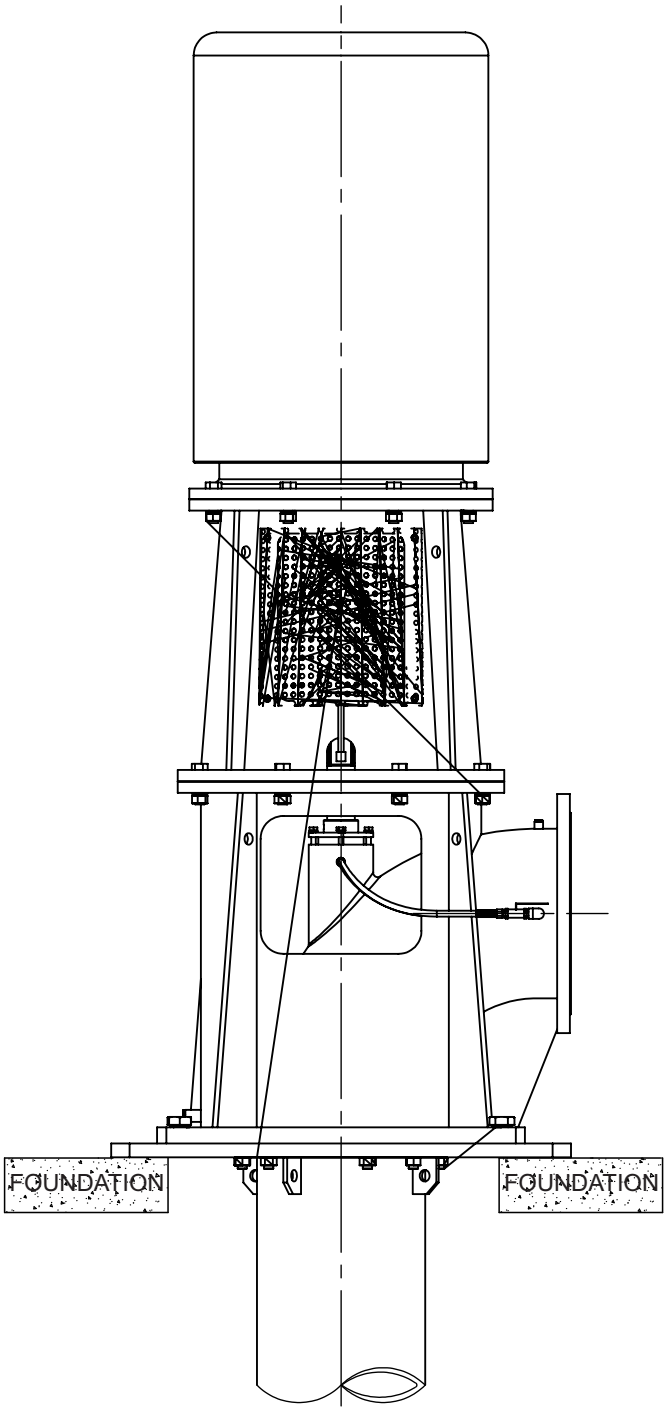


OIL LUBRICATION



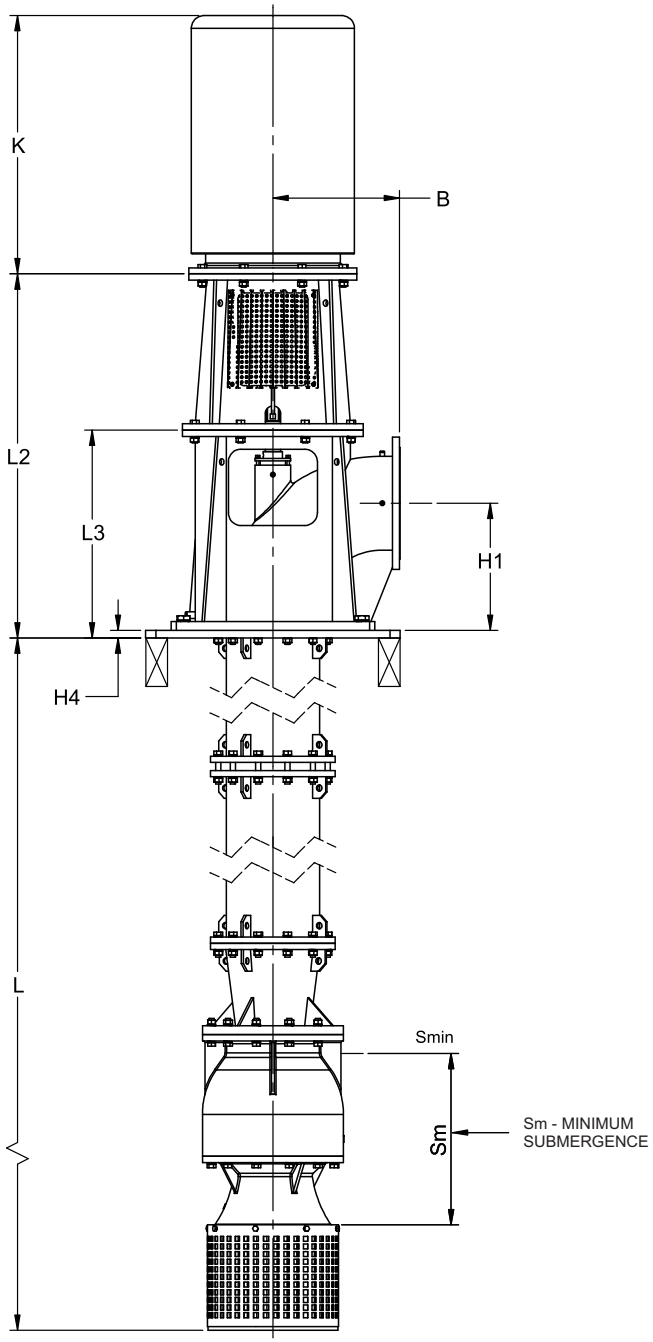
EXTERNAL CLEAR WATER LUBRICATION

DISCHARGE HEAD WITH ABOVE GROUND ARRANGEMENT

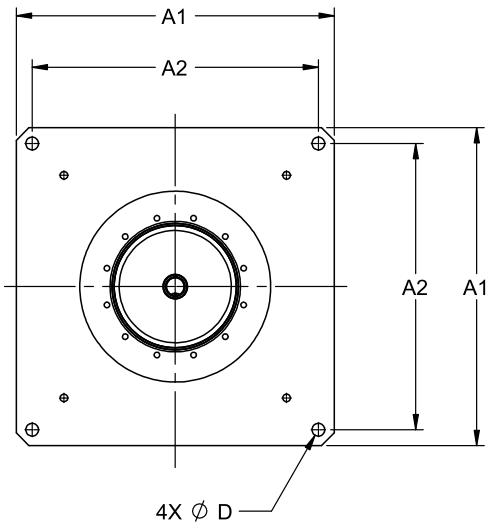


ABOVE GROUND ARRANGEMENT
DISCHARGE HEAD - MOTOR DRIVEN

GENERAL ARRANGEMENT DRAWING (GAD) WITH SOLID SHAFT MOTOR



SOLE PLATE

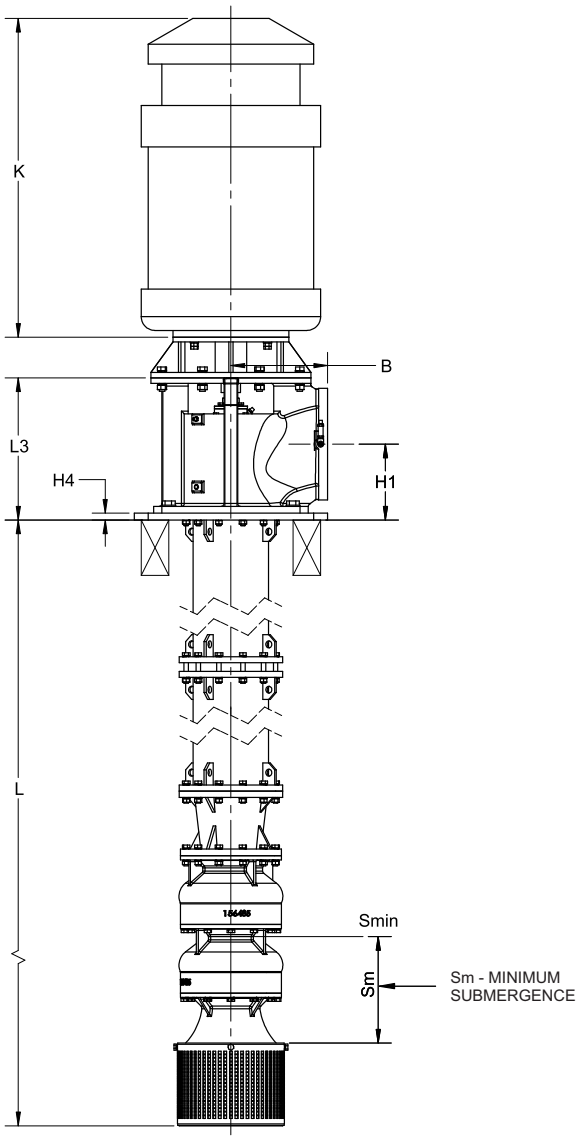


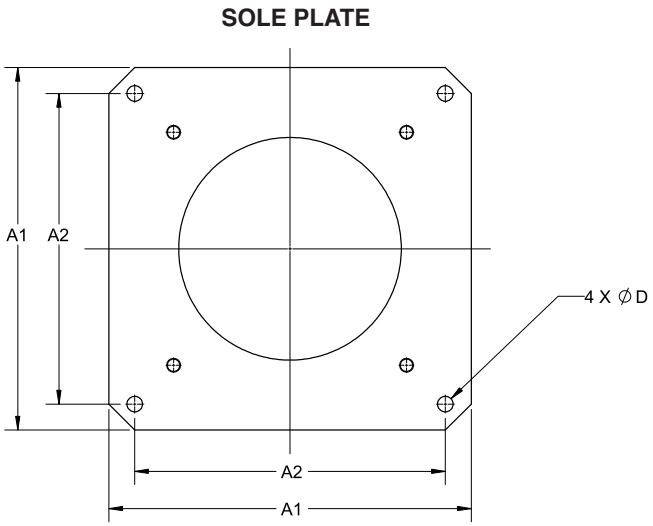
GENERAL DIMENSION & MOUNTING DETAILS

FOR SOLID SHAFT MOTOR

MODEL	DN	A1	A2	n- ∅D	H1	H4	B	Sm	L2	L3
VT40	150	520	430	4 - 30	175	25	260	295	800	405
VT70	150	520	430	4 - 30	175	25	260	330	800	405
VT115	150	520	430	4 - 30	175	25	260	380	800	405
VT170	150	520	430	4 - 30	175	25	260	485	850	405
VT270	200	560	450	4 - 30	200	25	280	535	910	445
VT400	200	560	450	4 - 30	200	25	280	585	940	445
VT500	250	560	450	4 - 30	250	30	350	635	1165	515
VT700	250	560	450	4 - 30	250	30	350	740	1165	515
VT1000	300	750	650	4 - 40	300	30	375	840	1300	746
VT1600	350	750	650	4 - 40	350	35	375	1040	1350	788
VT2300	450	900	750	4 - 40	450	35	500	1245	1350	800
VT3300	500	1300	1200	8 - 40	560	35	630	1425	1552	958
VT4500	700	1700	1500	8 - 40	770	40	850	1700	2089	1420
VT5500	700	1700	1500	8 - 40	770	40	850	1855	1923	1268
VT7300	800	1800	1650	8 - 40	870	40	900	2085	2071	1418
VT9500	900	2000	1840	8 - 40	970	40	950	2340	2610	1640

GENERAL ARRANGEMENT DRAWING (GAD) WITH VERTICAL HOLLOW SHAFT MOTOR



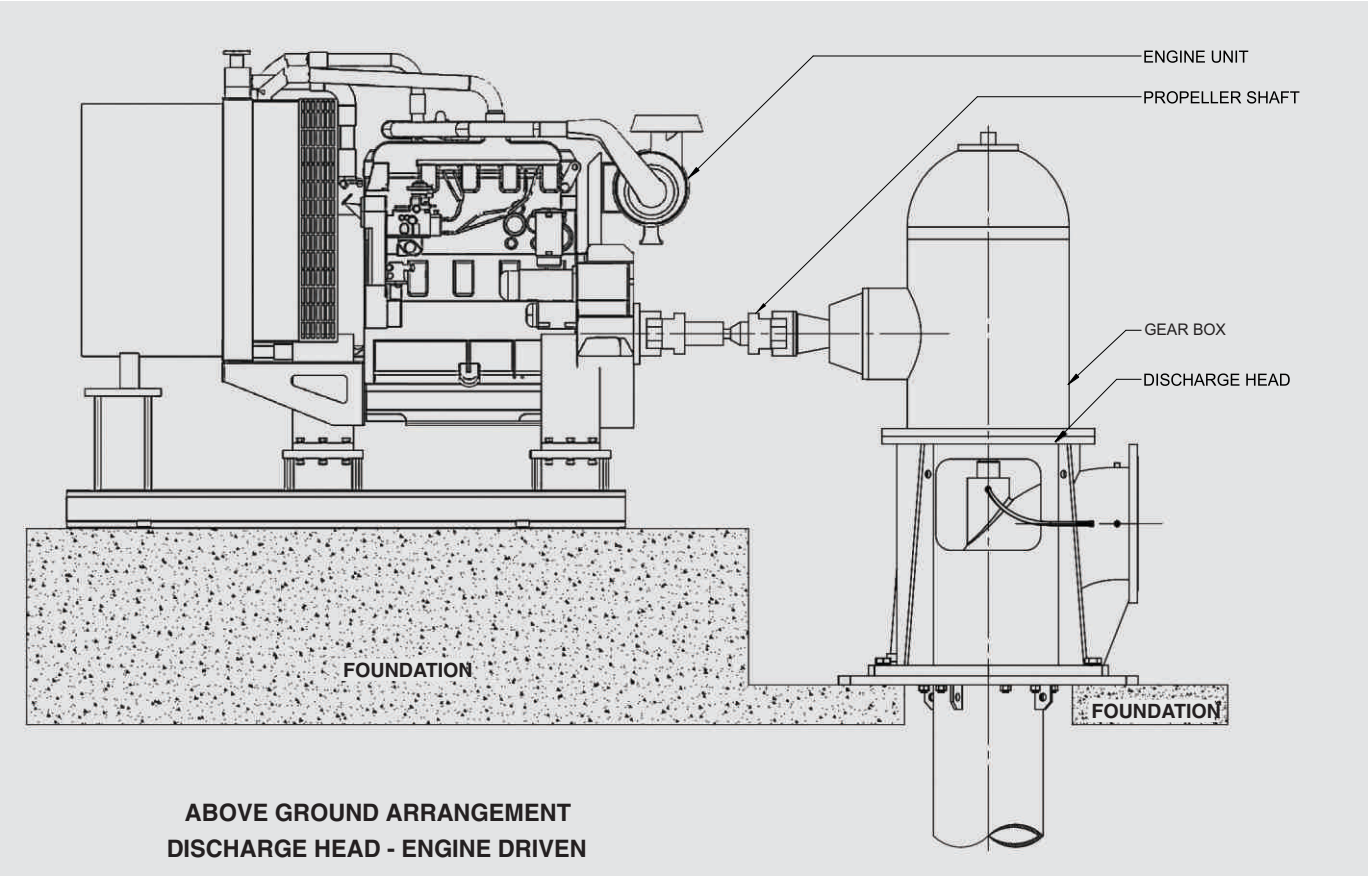


GENERAL DIMENSION & MOUNTING DETAILS

FOR VERTICAL HOLLOW SHAFT MOTOR

MODEL	DN	A1	A2	n- ∅D	H1	H4	B	Sm	L3
VT40	150	520	430	4 - 30	175	25	260	295	405
VT70	150	520	430	4 - 30	175	25	260	330	405
VT115	150	520	430	4 - 30	175	25	260	380	405
VT170	150	520	430	4 - 30	175	25	260	485	405
VT270	200	560	450	4 - 30	200	25	280	535	445
VT400	200	560	450	4 - 30	200	25	280	585	445
VT500	250	560	450	4 - 30	250	30	350	635	515
VT700	250	560	450	4 - 30	250	30	350	740	515
VT1000	300	750	650	4 - 40	300	30	375	840	746
VT1600	350	750	650	4 - 40	350	35	375	1040	788
VT2300	450	900	750	4 - 40	450	35	500	1245	800
VT3300	500	1300	1200	8 - 40	560	35	630	1425	958
VT4500	700	1700	1500	8 - 40	770	40	850	1700	1420
VT5500	700	1700	1500	8 - 40	770	40	850	1855	1268
VT7300	800	1800	1650	8 - 40	870	40	900	2085	1418
VT9500	900	2000	1840	8 - 40	970	40	950	2340	1640

ENGINE DRIVEN PUMP WITH RIGHT ANGLE GEAR BOX



ABOVE GROUND ARRANGEMENT
DISCHARGE HEAD - ENGINE DRIVEN

GENERAL DATA

CONVERSION CHART

Flow Rate

Litre per second l/s	Litre per minute l/min	Cubic meter per hour m^3/h	Cubic foot per hour ft^3/h	Cubic foot per minute ft^3/min	Imp.gallon per minute Imp. Gal/min	US gallon per minute Us Gal./min	Barrel per day
1	60	3.6	127.133	2.1189	13.2	15.85	543.439
0.017	1	0.06	2.1189	0.0353	0.22	0.264	9.057
0.278	16.667	1	35.3147	0.5886	3.666	4.403	150.955
0.008	0.472	0.0283	1	0.0167	0.104	0.125	4.275
0.472	28.317	1.6990	60	1	6.229	7.480	256.475
0.076	4.526	0.2728	9.6326	0.105	1	1.201	41.175
0.063	3.785	0.2271	8.0209	0.1337	0.833	1	34.286
0.002	0.110	0.0066	0.2339	0.0039	0.024	0.029	1

Liquid

Cubic meter m^3	litre l	Millilitre ml	Imp. gallon Imp. Gal	US gallon US Gal	Cubic foot ft^3
1	1000	1×10^6	220	264.2	35.3147
0.001	1	1000	0.22	0.2642	0.0353
1×10^{-6}	0.001	1	2.2×10^{-4}	2.642×10^{-4}	3.53×10^{-5}
0.00455	4.546	4546	1	1.201	0.1605
0.00378	3.785	3785	0.8327	1	0.1337
0.0283	27.317	28.317	6.2288	7.4805	1

Liquid Head and Pressure

newton per square n/m^2 or (Pa)	kilo pascal kPa	bar bar	kilogram force per square centimeter Kgf/cm2	pound force per square inch psl	Foot for water ft H_2O	meter of water m H_2O	millimeter of mercury mm Hg	Inch of mercury in Hg
1	0.001	1×10^{-5}	1.02×10^{-5}	1.45×10^{-4}	3.35×10^{-4}	1.02×10^{-4}	0.0075	2.95×10^{-4}
1000	1	0.01	0.0102	0.145	0.335	0.102	7	0.295
1×10^{-5}	100	1	1.02	14.5	33.52	10.02	750.1	29.53
98,067	98.07	0.981	1	14.22	32.52	10	735.6	28.96
6895	6.895	0.069	0.0703	1	2.31	0.703	51.72	0.036
2984	2.984	0.03	0.0305	0.433	1	0.305	22.42	0.882
9789	9.789	0.098	0.1	1.42	3.28	1	73.42	0.891
133.3	0.133	0.0013	0.0014	0.019	0.045	0.014	1	0.039
3386	3.386	0.0338	0.0345	0.491	1.133	0.0345	25.4	1

GENERAL DATA

CONVERSION CHART

Length

Millimeter mm	Centimeter cm	Meter m	Inch in	Feet ft	Yard yd
1	0.1	0.001	0.0394	0.0033	0.0011
10	1	0.01	0.3937	0.0328	0.0109
1000	100	1	39.3701	3.2808	1.0936
25.4	2.54	0.0254	1	0.0833	0.0278
304.8	30.48	0.3048	12	1	0.3333
914.4	91.44	0.9144	36	3	1

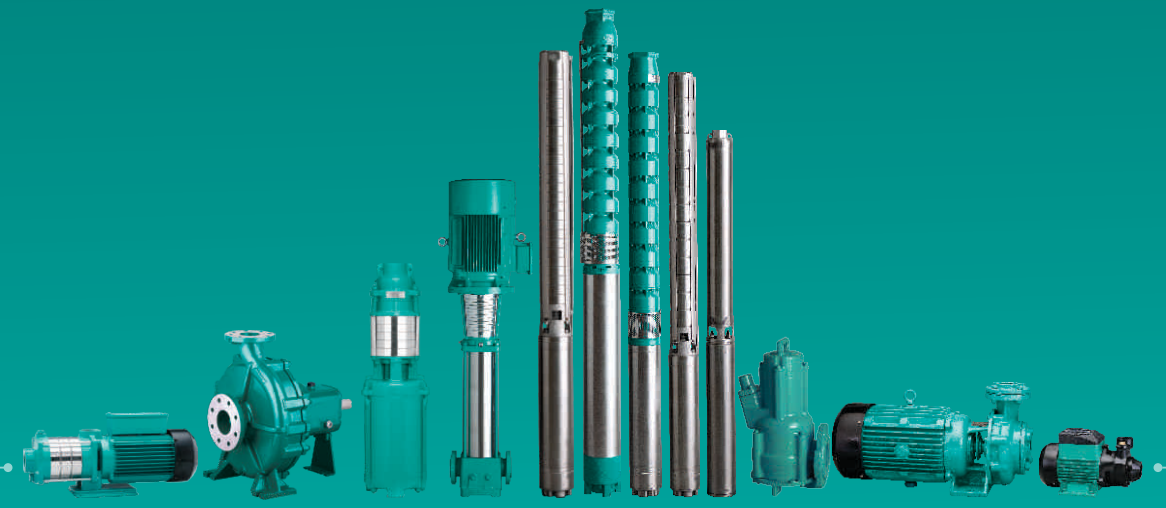
1 Kilometer = 1000 metres = 0.62137 miles 1 mile = 1609.37 metres = 1.60934 kilometres

Mass

Kilogram kg	Pound lb	Hundred weight (cwt)	tonne t	ton long tn	short ton sh tn
1	2.205	0.0197	0.001	9.84×10^{-4}	0.0011
0.454	1	0.0089	4.54×10^{-4}	4.46×10^{-4}	5.0×10^{-4}
50.802	112	1	0.0508	0.05	0.056
1000	2204.6	19.684	1	0.9842	1.1023
1016	2240	20	1.0161	1	1.102
907.2	2000	17.857	0.9072	0.8929	1

Temperature Conversion Table

From	TO	Use formula
Temperature Celsius, tc	Temperature Kelvin, tk	K = tc + 273.15
Temperature Fahrenheit, tf	Temperature Kelvin, tk	K = (tF + 459.67 / 1.8)
Temperature Celsius, tc	Temperature Fahrenheit, tf	F = 1.8 tc + 32
Temperature Fahrenheit, tf	Temperature Celsius, tc	C = (tF - 32) / 1.8
Temperature Kelvin, tk	Temperature Celsius, tc	C = tk - 273.15
Temperature Kelvin, tk	Temperature Fahrenheit, tf	F = 1.8tk - 459.67



THE POWER BEHIND THE FORCE

Naargo Industries Private Limited, one of the leading manufacturers of latest state of art, large range of pumps and motors, is managed by veterans who are in the pump industry for almost half a century. The products are employed in various applications like irrigation, domestic, civil construction, de-watering etc; The Company has a strong distribution network in India for sales & service and a strong global presence.

Quality is the key factor in Naargo's products. The expansive infrastructure and environment accredited with ISO 9001 quality certification, latest engineering softwares, high-tech machinery, futuristic pumping technology and high caliber workforce facilitate the production of flawless and efficient products on par with international standards under the brand name of "Tormac". The well equipped R & D wing stays alive to the changing global trends and comes out with viable solutions for innovative product development and upgradation.

The Products currently available include Stainless Steel Submersible Pumps, 4" Thermoplastic Submersible Pumps, 6" & 8" Cast Iron Submersible Pumps, Submersible Motors and Controls, Centrifugal Pumps, Inline Booster Pumps, Jet Self-priming Pumps and Peripheral Pumps.

The power, performance and endurance of the products backed by the uncompromising teamwork and value systems will certainly propel the company's growth towards new horizons in the pump industry.

IB-CM-DJ19-E5

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